Mini 11-101F Integrator

REC 3968, Rev L
Part No. 051033

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Thermo
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Mini 11-101F Integrator

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Revision History

Revision A	August 1996		
Revision B	March 1997		
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Revision H	December 2001		Updated removing password information section 4.5.5
Revision J	February 2002		Added jumper information, updated mother board drawing Figure 2-4
Revision K	June 2004`	ECO 0346	Revised Menu Tree
Revision L	September 2004	ECO 0419	Updated drawings

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About this Manual

This manual provides the information you need to install, operate, and maintain the Mini 11-101F Field Mount Integrator. This revision documents version 44.00.10.01 of integrator software.

Read this manual before working with the system. For personal and system safety, and for the best product performance, make sure you thoroughly understand the manual before installing, operating, or maintaining this machine.

Who Should Use this Manual?

The Mini 11-101F Field Mount Integrator Operating and Service Manual is a learning resource and reference for anyone concerned with installing, operating, or maintaining the integrator in a belt scale application.

Organization of the Manual

This manual is organized into five chapters and three Appendices.

Chapter 1: Introduction - gives you an overview of the device's capabilities, describes its functions, and lists its technical specifications.

Chapter 2: Installation - provides information about installing the Mini 11-101F Integrator including procedures for mounting, wiring, and configuring the system.

Chapter 3: Operation - provides information about setting up and operating the integrator. It includes a thorough description of the operator interface.

Chapter 4:Maintenance and Troubleshooting - provides information about maintenance and troubleshooting. It includes procedures for determining and correcting operational problems.

Chapter 5: Service, Repair, and Replacement Parts - tells you how to contact Thermo service departments for assistance and how to order parts for your Mini 11-101F Integrator.

Appendix A: Menus - contains an overall description of the integrator menu items.

Appendix B: Menu Trees - contains a condensed version of the menus and the sub-menus associated with them.

Appendix C: Engineering Drawings - contains engineering drawings applicable to the Mini 11-101F Integrator.

Appendix D: *Reader Comment Form*

Documentation Conventions

The following conventions are used in this manual to help easily identify certain types of information:

- *Italic* is used to introduce new terms and for emphasis.
- *Italic/blue* type is used for references to other sections of the manual and serve as links in electronic documents.
- The names of setup, calibration displays, menu displays, and variables are shown in **SMALL CAPS**.
- The names of keys are shown in **BOLD CAPITALS.**

▪ **Note:** Provides information of special importance to the reader.

- This symbol indicates a **HINT** in the text that may be of value but not necessary for operation.

Safety Messages

Instructions in this manual may require special precautions to ensure the safety of the personnel performing the operations.

Please read the safety information before performing any operation preceded by this symbol. ⚠

There are two levels of safety messages: warnings and cautions. The distinction between the two is as follows:

⚠ **WARNING**
Failure to observe could result in death or serious injury.

⚠ **CAUTION**
Failure to observe may cause minor injury or damage the equipment

General Precaution

Do not install, operate, or perform any maintenance procedures until you have read the safety precautions presented.

WARNING

Failure to follow safe installation and servicing procedures could result in death or serious injury.

- Make sure only qualified personnel perform installation and maintenance procedures in accordance with the instructions in this manual.
- Allow only qualified electricians to open and work in the electronics cabinets, powersupply cabinets, control cabinets, or switch boxes.
- Covers over the electronics and rotating parts must always remin in place during normal operation. Remove only for maintenance, with the machine's power OFF. Replace all covers before resuming operation.
- During maintenance, a safety tag (not supplied by the factory) is to be displayed in the ON/OFF switch areas in structing others not to operate the unit (ANSI:B157.1)

WARNING

High voltage that may be present on leads could cause electrical shock.

- All switches must be OFF when checkin input AC electrical connections, removing or inserting printed circuit boards, or attaching voltmeters to the system.
- Use extreme caution when testing in, on, or around the electronics cabinet, PC boards, or modules. There are voltages in excess of 115 V or 230 V in these areas.

WARNING

Keep hands and clothing away from all moving or rotating parts.

CAUTION

Do no place or store objects of any kind on the machine.

CAUTION

This machine should not be operated at more than the production rate stated on your Equipment Specification sheet or used in applications other than those stated in the original order.

Weighing accuracy may be adversely affected by changes in production rate or application.

To adapt production rates or applications, contact your service representative.

Occupational Safety and Health Act (OSHA)

The *Occupational Safety and Health Act* clearly places the burden of compliance on the user of the equipment and the act is generalized to the extent that determination of compliance is a judgment decision on the part of the local inspection. Hence, *Thermo* will not be responsible for meeting the full requirements of OSHA in respect to the equipment supplied or for any penalty assessed for failure to meet the requirements, in respect to the equipment supplied, of the *Occupational Safety and Health Act*, as interpreted by an authorized inspector. *Thermo* will use their best efforts to remedy such violation at a reasonable cost to the buyer.

Thermo Warranty

The seller agrees, represents, and warrants that the equipment delivered hereunder shall be free from defects in material and workmanship. Such warranty shall not apply to accessories, parts, or material purchased by the seller unless they are manufactured pursuant to seller's design, but shall apply to the workmanship incorporated in the installation of such items in the complete equipment. To the extent purchased parts or accessories are covered by the manufacturer's warranty, seller shall extend such warranty to buyer.

Seller's obligation under said warranty is conditioned upon the return of the defective equipment, transportation charges prepaid, to the seller's factory in Minneapolis, Minnesota, and the submission of reasonable proof to seller prior to return of the equipment that the defect is due to a matter embraced within seller's warranty hereunder. Any such defect in material and workmanship shall be presented to seller as soon as such alleged errors or defects are discovered by purchaser and seller is given opportunity to investigate and correct alleged errors or defects and in all cases, buyer must have notified seller thereof within one (1) year after delivery, or one (1) year after installation if the installation was accomplished by the seller.

Said warranty shall not apply if the equipment shall not have been operated and maintained in accordance with seller's written instructions applicable to such equipment, or if such equipment shall have been repaired or altered or modified without seller's approval; provided, however, that the foregoing limitation of warranty insofar as it relates to repairs, alterations, or modifications, shall not be applicable to routine preventive and corrective maintenance which normally occur in the operation of the equipment.

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Purchaser agrees to underwrite the cost of any labor required for replacement; including time, travel, and living expenses of a *Thermo* Field Service Engineer at the closest factory base.

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Chapter 1
Introduction

This chapter introduces the Mini 11-101F Field Mount Integrator. It gives you an overview of the device's capabilities, describes its basic functionality, and lists its technical specifications.

1.1. Overview

The Mini 11-101F Field Mount Integrator is a simple, microprocessor-based integrator that provides basic rate and total information in a belt conveyor scale system.

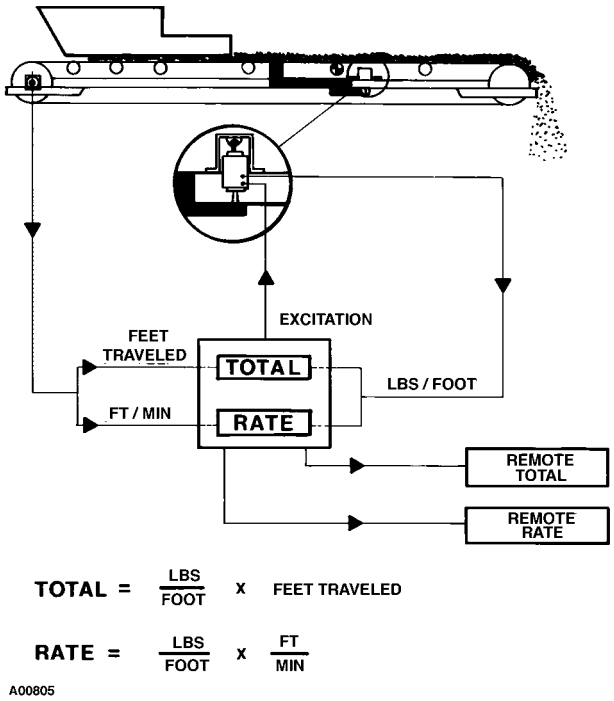
In most installations, no modification of existing equipment is necessary to accommodate the Mini 11-101F Integrator

1.2. System Description

The Mini 11-101F Integrator can be used with various Thermo scale systems. Belt conveyor scales provide a means of weighing bulk materials while in motion. The weight on the conveyor belt is measured by sensing the force on one or more conveyor idlers. The motion of the material is measured by sensing travel of the belt with a device which produces an "output" representing a fixed distance of belt travel. The measured force represents weight per unit length (kg/m or lbs/ft); it can be multiplied by the belt travel to acquire total weight. (Example: lbs/ft x ft = lbs; Kg/m x m = Kg).

Figure 1-1 shows a simplified functional diagram of a belt scale system with an integrator.

Figure 1-1: Belt Scale System Diagram



1.3. Description

The Mini 11-101F Integrator is a microprocessor-based instrument that derives the rate and quantity of material flowing over a belt scale from signals representing the weight per belt length of moving material (lb/ft) and belt travel (ft/min).

By processing these two input signals along with belt speed, the integrator produces visible and electrical outputs representing the rate of material movement and the total amount of material that has passed over the belt conveyor scale.

The Mini 11-101F Integrator uses a millivolt analog input signal from the load cell(s) and comes standard with a 4–20 mA analog output for remote flow rate indication. It has provisions for three programmable digital inputs and four programmable digital outputs, one for remote totalization. There are three options available for remote indicating:

- Remote totalization
- Remote flow rate
- Printing

The integrator functions are resident in the software of the microprocessor. The optional printer function is available for serial output connection to a printer when the required communication board is installed.

- The Mini 11-101F Integrator supports these additional features:
- Menu driven operator entries from a front panel
- Five LED status indicators
- Non-volatile RAM for storing programming information
- Automatic zero and span calibration
- Auto zero tracking
- Programmable digital inputs and outputs
- Alarms and failure detection
- Remote load cell sense line connections for distances over 200 ft

1.3.1. Standard Configuration

The standard configuration of the Mini 11-101F Integrator includes:

- Analog output for remote material flow rate indication
- Four digital dry contact outputs, one for remote totalization
- Three dry contact digital status inputs

1.3.2. Measuring Function

The Mini 11-101F Integrator is directly connected to up to four 350-ohm load cells from which it receives output signals representing the weight of material on the belt. It receives pulse stream signals from the speed sensor that it uses to calculate belt speed and feed rate.

1.3.2.1 Instantaneous Flow Rate Calculation

The signal delivered by the load cell(s), which represents the weight per unit length on the belt (lb/ft), is multiplied by the signal delivered by the speed sensor, which represents the belt speed (ft/min).

The result of this operation is the instantaneous flow rate (lb/ft ¥ ft/min = lb/min), which is in turn multiplied by a constant to obtain the value in the required engineering units (kg/hour, ton/hour). An adjustable damping filter is provided for displayed rate.

1.3.2.2 Flow Totalization

Rate is integrated in time to calculate the total amount of material conveyed by the belt, which is displayed in two individual registers: master total and reset total. The total is accumulated by multiplying [weight per unit length] by [incremental length] and totalizing the result in engineering units.

Two totalizing memories are provided:

- The first memory (Master Total) cannot be reset, which guarantees that the data is not lost because of an unintentional reset.
- The second memory (Reset Total) can be reset by the operator and is normally used for shift or daily totalization.

1.3.2.3 Automatic Zero and Span Calibration

The Mini 11-101 Integrator can perform automatic zero and automatic span calibrations. Zero and span calibrations are based on belt length defined by the number of belt revolutions.

To calculate the exact number of revolutions, the instrument counts the pulses delivered by the speed sensor (one pulse represents a specific belt length). When the required number of pulses is reached, the instrument ends the calibration test and compares the actual totalized value to the theoretical value (0 for zero calibration), and calculates the correct settings for zero or span.

1.3.2.4 Auto Zero Tracking

When the belt is running and the rate is below a certain percentage of scale capacity, the Mini 11-101F can perform auto zero tracking (AZT) to minimize zero error caused by material and dust buildup.

Under a preset minimum flow rate, the Mini 11-101F makes subsequent automatic zero calibrations in this sequence:

1. Waits for ½ the time of the established test duration (a solid 'Z' will be displayed)
2. Executes a zero test (the 'Z' will flash)
3. Performs an automatic zero for one test duration
4. Continuously repeats the above zero calibration as long as the feed rate remains below the AZT preset value

The AZT function is limited to a maximum value of zero limit that is set in percent in the SCALE DATA scroll. If the new zero calculated by AZT, exceeds that value, an alarm is generated and the new zero is not installed. The reference value for zero is reset every time an auto zero or manual zero is performed.

1.3.2.5 Setting the Auto Zero Track Range (AZT)

Auto Zero Tracking, when enabled, allows continuous unassisted auto zeroing if the flow rate is less than an amount in percent of scale capacity (AZT Range in scale data). The flow rate must remain below AZT range for at least 2 test durations for a successful Auto Zero Track cycle to be completed.

Auto Zero Tracking is enabled by entering a value other than zero. When enabled, a 'Z' will appear in the left hand side of the flow rate display. When the 'Z' is steady, it indicates that the actual AZT cycle has started. The 'Z' continues flashing until the cycle is complete and zero is automatically changed if necessary. This procedure repeats itself as long as the belt is running and the flow rate remains below AZT range.

1.3.2.6 Dead Band

The Dead Band is a percentage of the scale capacity (rate) in which the rate is ignored and a zero rate is forced. Totalization is frozen when the rate is below the dead band setting.

1.3.2.7 Current Output Signals

The standard Mini 11-101F is equipped with one electrical current output signal (0–20/4-20/20-0/20-4 mA) for remote flow rate. Analog output can be smoothed via a damping filter that can be programmed for time or length delay.

Displayed variables and analog output can be smoothed via damping filters.

1.3.3. Monitoring Functions

The Mini 11-101F Integrator is equipped with internal diagnostics and an indicator and control system that notifies you of:

- Status
- Process alarms
- Programming errors
- Equipment failures

If any of the controlled conditions occurs, it is indicated by LED lighting on the Mini 11-101F front panel and by a digital output.

Alarms are shown on the front panel display and can be acknowledged and reset through the operator interface or digital input. Each individual alarm can be programmed to operate as alarm, shut down, or to be ignored.

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Alarms are shown on the front panel display and can be acknowledged and reset through the operator interface or digital input. Each individual alarm can be programmed to operate as alarm, shut down, or to be ignored.

1.3.3.1 Status Indications

The following status indications are shown on the Mini 11-101F front panel:

- Conveyor belt is running

  The Run LED is lit.

- There is an alarm that has been triggered

  The Alarm LED is lit and the screen is flashing the alarm name.

- The integrator is in the process of doing a span calibration

  The Span Cal LED is lit.

- The integrator is performing zero calibration

  The Zero Cal LED is lit

- Power applied, scale calibrated, no alarms, and the ready LED is lit

1.3.3.2 Process Alarms

The following process conditions are monitored and produce alarms or shut down according to how they are defined in the Mini 11-101F configurations. A delay time before the abnormal condition is monitored may be set for each individual alarm.

- Low Rate
- High Rate
- Remote Counter Overflow
- Belt Pulse Counter Overflow

Each alarm condition can be defined as:

- Alarm - Generate an alarm message. The machine continues to run.

  When an alarm occurs, the ALARM LED on the front panel and the word “ALARM” on the menu screen are flashing

- Fail - Generate an alarm message and turn off the READY LED and output. The machine stops.

  When a fail alarm occurs, the ALARM LED on the front panel and the word specific alarm on the display are flashing. The Ready LED goes off.

- None - Alarm is deactivated no action.

1.3.3.3 Programming Errors

Programming errors occur only during set up or calibration of the Mini 11-101F. They result from entering data that is outside of the operating range for the instrument. If you enter data that is lower or higher than the limits for a given parameter, the system displays a warning message. You will have to enter valid parameters before continuing with set up and calibration.

1.3.3.4 Equipment Failures

The following operating conditions can be monitored and produce alarms or shut down according to how they are defined in the integrator configuration. A delay time before the abnormal condition is monitored may be set for each individual alarm.

- Cold Start
- Load Cell Failure
- Maximum Zero Correction
- Math Error

1.3.4. Print Functions

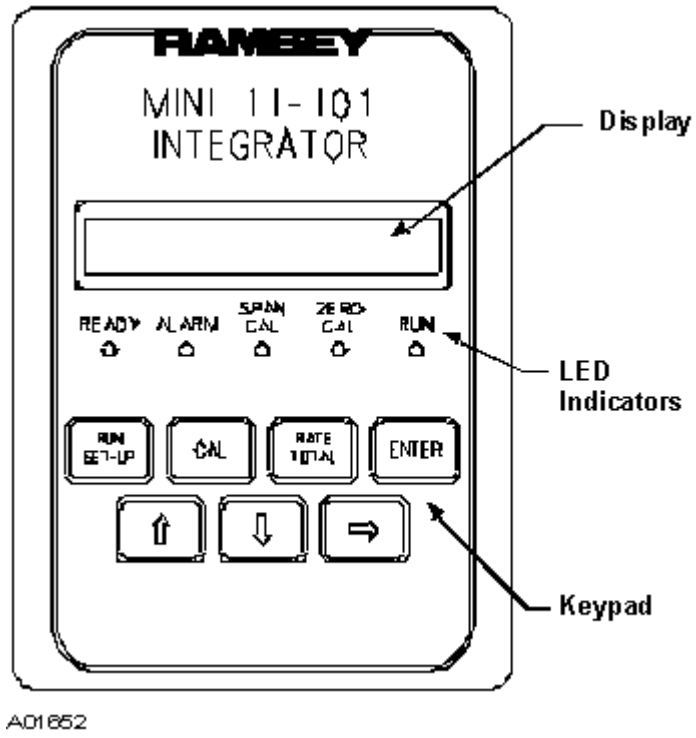
The following print functions are available when the optional communication board is installed and configured in the Mini 11-101F.

- Print on command - From the front panel, the integrator has the ability to print current conditions.
- Print at pre-selected time intervals - Specifies the interval of time between automatic printouts of the totals.
- Print machine setup - Allows you to define the parameters of your printer and the resulting printout definitions.

1.3.5. Operator Interface

The operator interface to the Mini 11-101F Integrator is used for initial setup and machine operation. The front panel provides an LED display for viewing run time information or system menus and a keypad for entering data and performing operations. The operator interface is based on a menu structure that guides you through setup and maintenance activities.

Figure 1-2: Mini 11-101F Integrator Front Panel



1.3.5.1 Display

The single-line by 16-character alphanumeric display shows actual run-time information or shows the menus used for Mini 11-101F setup, calibration, and testing.

1.3.5.2 LED Indicators

The five red LED indicators across the middle of the front panel show the current operating status of the Mini 11-101F. When lit, these indicators mean:

- **READY** - Integrator power is on, the scale is calibrated, and no failure has occurred
- **ALARM** - An integrator alarm or failure has occurred
- **SPAN CAL** - Flashes during a span calibration
- **ZERO CAL**- Flashes during a zero calibration
- **RUN** - The belt is running

1.3.5.3 Keypad

The front panel keypad has seven multifunctional keys that are used for all data entry, setup, and calibrations on the Mini 11-101F.

- **RUN/SET-UP** - Switches the Mini 11-101F between normal Run mode and Setup mode.
- **CAL** - Puts the Mini 11-101F into Calibration mode.
- **RATE/TOTAL** - Switches the Run Menu display among Rate, Master Total, Reset Total, Alarms, and (if installed) Print.
- **ENTER** - The function of this key varies. Pressing enter:
  - Moves down one level when in Setup mode and opens the main menus.
  - Opens a field for data entry
  - Confirms a newly-entered value

↑ - The function of this key varies. Pressing ↑ arrow key:

- Moves up one level when in Setup mode
- Scrolls selections within Setup menus
- Scrolls up digits for numerical data entry

↓ - The function of this key varies. Pressing the ↓ arrow key:

- Scrolls selections at the same level when in Setup mode
- Scrolls selections within Setup menus
- Scrolls down digits for numerical data entry

→ - Pressing the → arrow key moves the cursor to the next digit in numerical entries.

Note: Numbers produced by pressing the arrow keys are not actually "entered" into a field until you press the Enter soft key to confirm.

1.4. Menu Structure

The operator interface to the Mini 11-101F is based on a menu structure that guides you through all setup and calibration activities and all operations and maintenance after the integrator has been configured.

All main system menus are similar in appearance and operate in a similar manner. (See Appendix A for a full display of the menu items.)

1.5. Data Entry

The Mini 11-101F Integrator is a menu driven machine that allows you to access all set-up, test, and calibration parameters through the keypad.

Set-up menus can be accessed by pressing the Run/Set-Up key. After pressing the key, the first set-up menu (Protection) should appear. The set-up menus are:

- **PROTECTION**
- **SCALE DATA**
- **CAL (CALIBRATION) DATA**
- **I/O (INPUT/OUTPUT) DATA**
- **ALARMS**
- **PRINT (OPTIONAL)**
- **TEST**

For initial set-up and calibrating, only Scale Data, Cal (calibration) Data, and I/O Data need to be completed.

Note: Consult Appendix A for a complete list of menu items to include descriptions and minimum/maximum values. Consult Appendix B for a menu tree with an overall view of menu items.

1.5.1. Navigating the Menus

The rules for navigating the menus are as follows:

1. To move down one level, use the **ENTER** key.
2. To move up one level, use the ↑ key.
3. To scroll at the same level, use the ↓ key.

1.5.2. Entering Numbers

To enter or change numbers use the following procedure:

1. Press **ENTER**

   The number displays with all the digits

2. Press → to position the cursor at the digit to be changed.
3. Use the ↑ and ↓ keys to scroll to the desired number.
4. Repeat Step 1 and 2 until all required digits have been changed.
5. Press **ENTER** to confirm and save the changes.
6. Press **RUN/SET-UP** to return to Run mode.

1.5.3. Selecting Default Values or Changing a Value Selection

To change a previous selection or the default follow these procedures:

1. Press **ENTER**

   The current selection is displayed.

2. Press **ENTER** a second time and the display flashes.
3. Use the ↑ and ↓ keys to scroll to the desired selection.
4. Press **ENTER** to confirm and save the selection.
5. Press **RUN/SET-UP** to return to Run mode.

1.6. Technical Specifications

This section lists the technical specifications for the Mini 11-101F Field Mount Integrator.

Enclosure - Field Mount

Dimensions:

Height: 11.81 in. (300 mm)

Width: 9.84 in. (250 mm)

Depth: 6.30 in. (160 mm)

Weight:

8.8 lb (4 kg)

Material:

Polyester, molded, gray

Acrylic door window

Protection:

IP 65 (NEMA 4) dust and low-pressure watertight

Other:

Two-position mounting feet

Triangular door lock

Environmental Conditions

Location:

Indoor/outdoor, without being exposed to excessive heat, moisture, or vibration

Can be mounted up to 3,000 ft (914 m) from the load cell(s)

Temperature:

Operating: 14 to 122°F (–10 to 50°C)

Storage: –4 to 158°F (–20 to 70°C)

Relative Humidity:

Up to 90% non-condensing

Power Requirements

Nominal Voltage:

110 or 220 VAC, selectable

Nominal Frequency:

50/60 Hz

Operating Range (nominal voltage +10%, –15%):

95.5–121 VAC (110 VAC nom.)

187–242 VAC (220 VAC nom.)

Power Consumption:

15 VA maximum

Fusing:

L1 side of line

1.0 A, Slo-Blo, 110 VAC, 5 x 20 mm

0.5 A, Slo-Blo, 220 VAC, 5 x 20 mm

Power Switch:

Switches both L1 (line) and L2 (neutral)

Load Cell

Number:

Up to four 350 ohm load cells in parallel

Cable Distance:

≤ 200 ft without sensing

201 to 3,000 ft: local or remote sense required, jumper selectable

Cable:

≤200 ft: 4 conductor, shielded, 16 AWG (Belden #8407 or equivalent)

201 to 3,000 ft: 6 conductor, shielded, 20 AWG (Belden #9260 or equivalent)

Excitation:

10 VDC ±0.5% @ 120 mA maximum

Sensitivity:

1.0–3.5 mV/V (selectable)

Input Signal:

35 mV

Input Impedance:

700 ohm minimum

Maximum Usable Signal:

114% of 3 mV/V

Digital Speed Sensor Input

Comparator-based input with hysteresis

Optically isolated

Built-in electrical current source for dry contact type

Power:

+14 VDC

Frequency Range:

Voltage/electrical current type sensor: 0.25–2.0 kHz

Contact closure type sensor: 0.25–30 Hz

Low Threshold:

+1.0 VDC minimum

High Threshold:

+3.2 VDC maximum

Low or High Pulse Duration:

Voltage/electrical current type sensor: 200 µ minimum

Contact closure type sensor: 15 µ minimum

Hysteresis:

0.5 VDC minimum

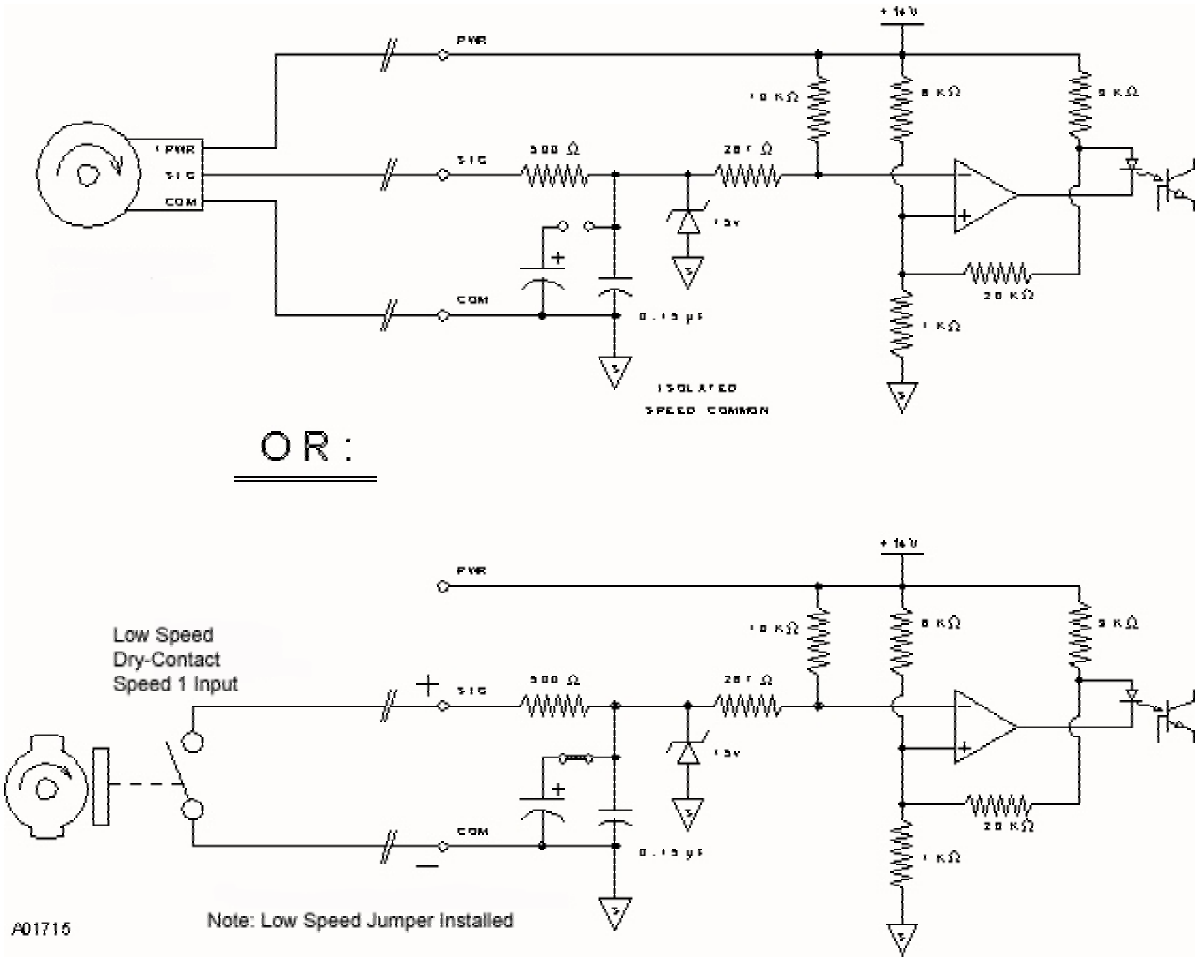
Input Impedance:

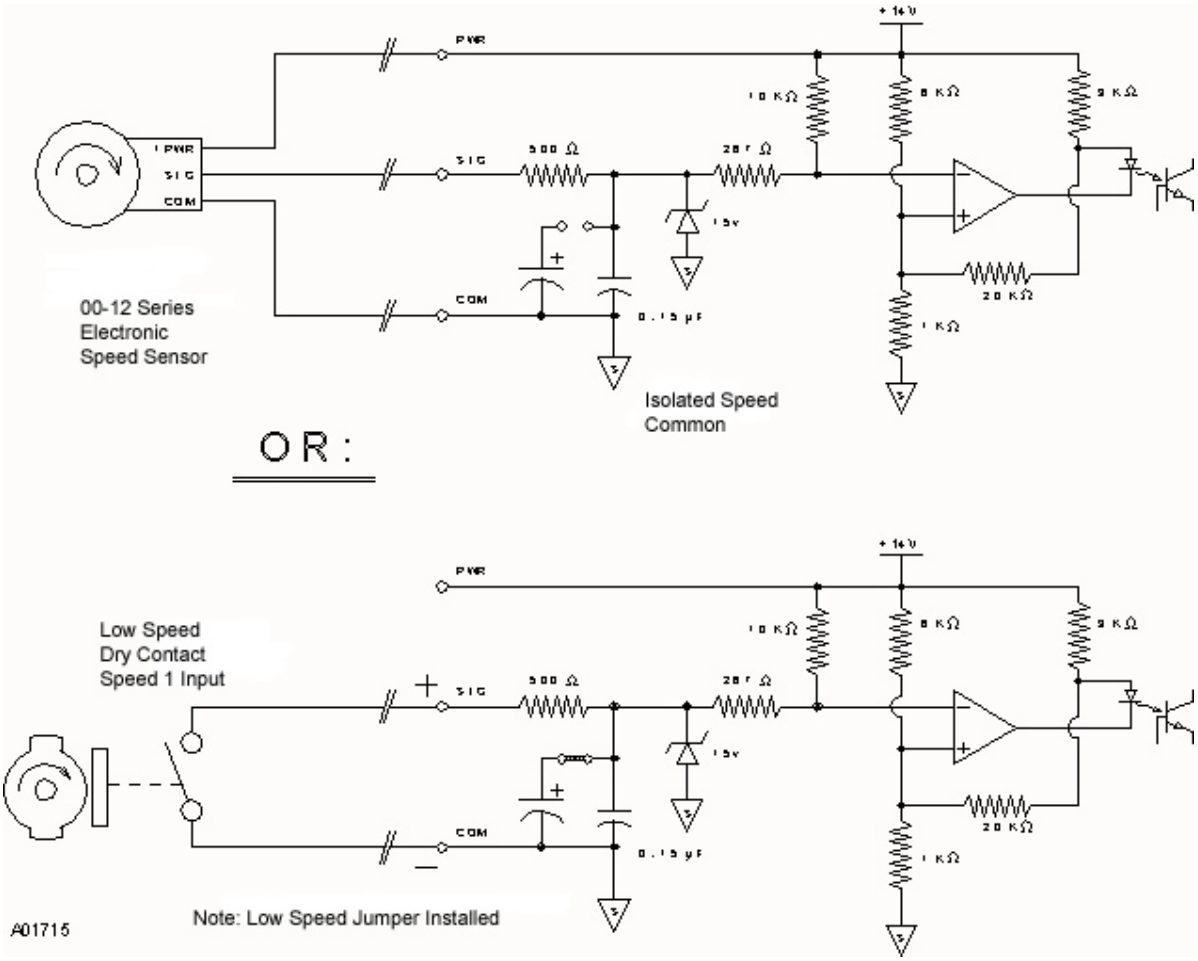
10 kohm typical, 500 ohm minimum

Maximum Non-destructive Input Voltage:

±50 V peak, continuous

Figure 1-3: Logic Diagram Speed Sensor Input


+ 14 V
PWR
SIG
COM
10 KΩ
8 KΩ
9 KΩ
500 Ω
20 KΩ
15V
0.15 µF
20 KΩ
1 KΩ
ISOLATED
SPEED COMMON
OR :
Low Speed
Dry-Contact
Speed 1 Input
A01715
Note: Low Speed Jumper Installed



General Purpose Digital Inputs

Quantity:

Three

Type:

Static, for dry contact or open collector

Insulation:

Optical, 2,500 Vrms (UL E67349)

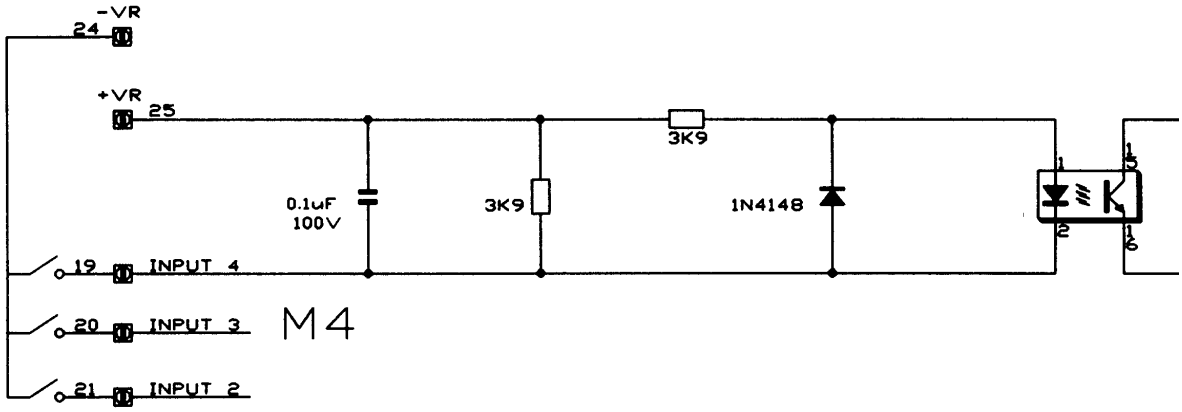
Voltage:

14 VDC (internal source available)

Electrical current:

6 mA

Figure 1-4: Logic Diagram General Purpose Digital Inputs 2, 3, and 4



General Purpose Digital Outputs

Quantity:

Four

Type:

Relay, dry contact, normally open (NO)

Insulation:

Galvanic, 10,000 m ohm

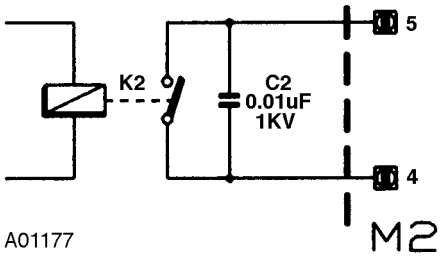
Voltage:

Maximum 240 VAC, 48 VDC

Electrical Current:

Maximum 0.5A

Figure 1-5: Relay Outputs



Analog Input

Millivolt signal from load cell(s)

Analog Output

Quantity:

One

Type:

Selectable: 0-20 mA, 4-20 mA, 20-0 mA, 20-4 mA

Maximum Load:

500 ohm

Resolution:

12 bit (4,096 divisions)

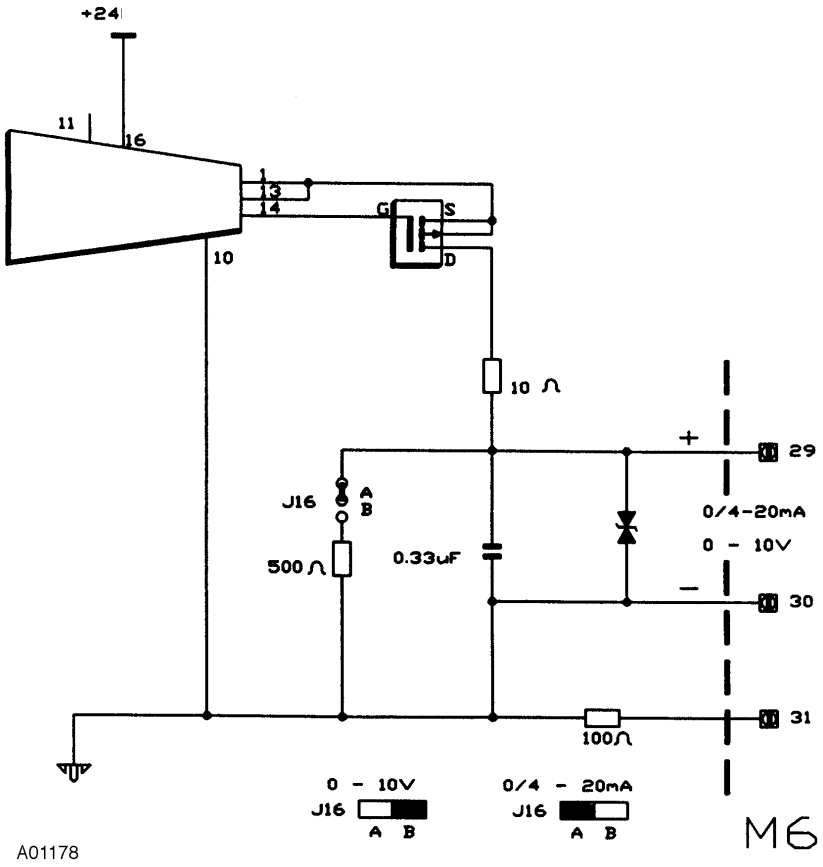
Linearity:

0.1%

Insulation:

Galvanic, 1,500 Vrms

Figure 1-6: Logic Diagram: High Level Analog Output



Printer Port

Quantity:

One

Type:

RS-232C/422

Null modem (Ready/Busy Signal)

Wire Connections:

Terminal Block

Signals:

TX, RX, CTS, RTS

Speed:

1200, 2400, 4800, 9600, 19200, 38400 band (selectable)

Word Length:

7,8 bits (selectable)

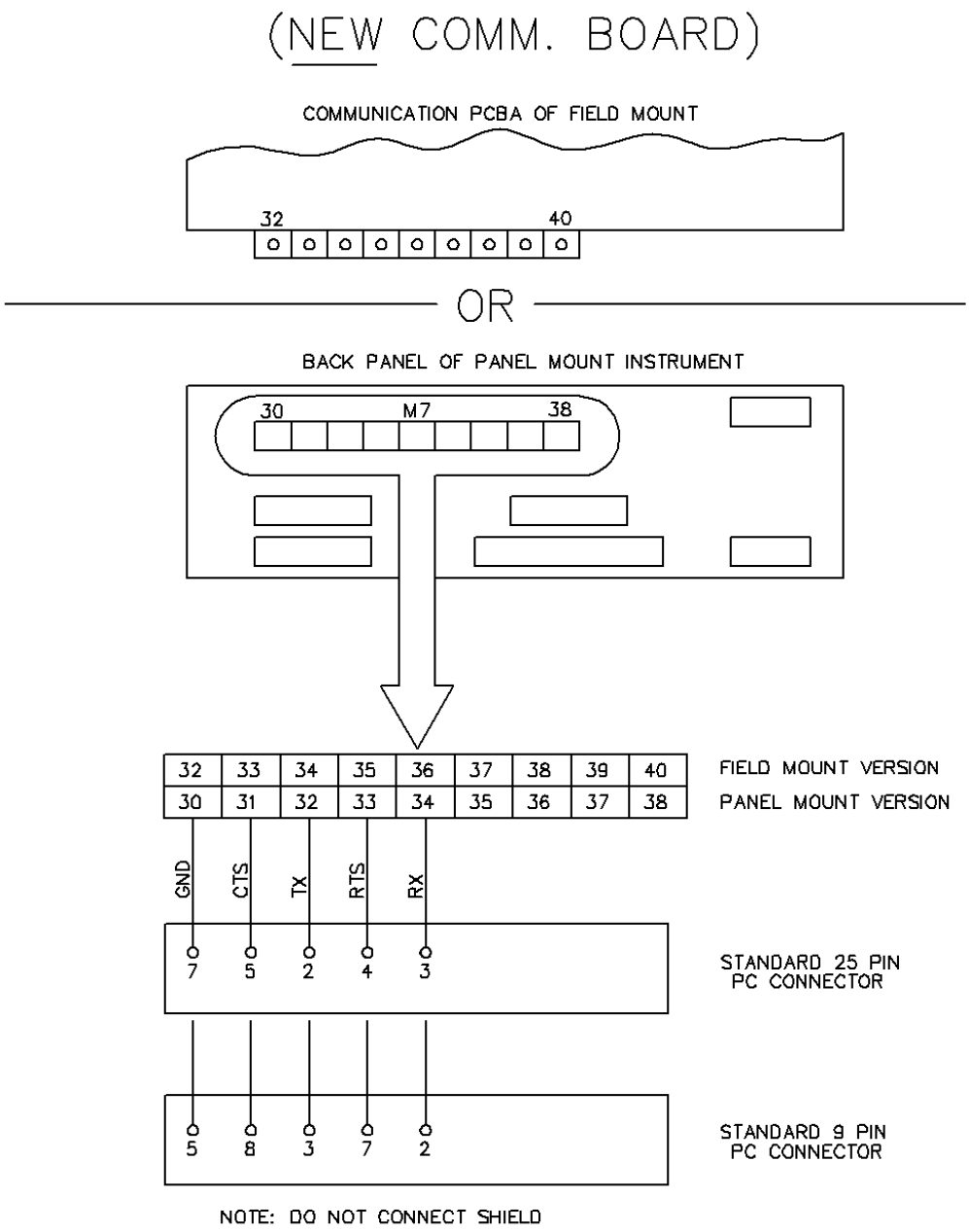
Stop Bits:

1, 2 bits (selectable)

Parity:

Odd, Even, None (selectable)

Figure 1-7: Signal Connections: Printer Options



Chapter 2
Installation

This chapter provides information about installing and setting up the Mini 11-101F. It discusses installation considerations, provides procedures for mounting, and wiring, describes the hardware configuration, and provides procedures for determining initial setup parameters for the device.

2.1. Overview

The customer is responsible for initial inspection of the equipment and for site preparation. It is essential that the equipment be placed on the production line in accordance with the guidelines set forth in this chapter.

The customer must ensure that qualified personnel are available to make interconnections with other production equipment and perform work at the installation site. A customer service representative is available to assist with installation and verify operation as well as train personnel assigned to operate and maintain the equipment.

2.2. Installation Considerations

Do not connect power to the machine or turn on the unit until you have read and understood this entire chapter. The precautions and procedures presented in this chapter must be followed carefully to prevent equipment damage and protect you from possible injury.

WARNING

Failure to follow safe installation and servicing procedures could result in death or serious injury.

- Make sure only qualified personnel perform installation and maintenance procedures in accordance with the instrucions in this manual.
- Allow only qualified electricians to open and work in the electronics cabinets, power supply cabinets, control cabinets, or switch boxes.

2.2.1. Equipment Location

The Mini 11-101F Integrator mounting site should be selected with care. The enclosure should be mounted as close to the load cell as possible without being exposed to excessive vibration, heat, and moisture.

- The Mini 11-101F may be mounted up to 3,000 ft from the speed sensor.
- The unit should be in a control room environment where it will not be exposed to excessive vibration, heat, cold, or moisture.
- Mount the unit at a height that makes it convenient to use the operator interface front panel.
- Make sure there is enough room to open the enclosure door and lift the chassis cover.

2.2.2. Environmental Factors

The Mini 11-101F Integrator is designed to operate in an environment where the temperature ranges no lower than 14°F (–10 °C) and no higher than 122°F (40°C).

The instrument will operate in an environment where the humidity ranges from 0–90%.

2.2.3. Input Power Requirements

The Mini 11-101F Integrator is factory configured at 110 VAC.

Nominal Voltage	Operating Range	Fusing	Power Consumption	Nominal Frequency
110 VAC	+10% - 15%	1.0 A	15 VA	50/60 Hz
220 VAC	+10% - 15%	.5 A	15 VA	50/60 Hz

2.2.4. Safety Precautions

WARNING

Failure to follow safe installation and servicing procedures could result in death or serious injury.

- Make sure only qualified personnel perform installation and maintenance procedures in accordance with the instrucions in this manual.
- Allow only qualified electricians to open and work in the electronics cabinets, power supply cabinets, control cabinets, or switch boxes.

WARNING

High voltage that may be present on leads could cause electrical shock.

- Disconnect incoming power at mains before beginning any installation or wiring procedures.
- Use extreme caution when testing in , on, or around the electronics, PC boards, or modules. There are voltages in excess of 115 V or 230 V in these areas.
- Covers over the electronics should always remain in place during operation. Remove only for maintenance procedures with the machines' power OFF. Replace all covers before resuming operation.

CAUTION

All wiring must be done in accordance with filed wiring diagrams, applicable sections of the National Electrical Code, and local electrical codes.

CAUTION

Keep hands and clothing away from all moving or rotating parts.

CAUTION

Do no place or store objects of any kind on this unit.

2.3. Equipment Handling

The Mini 11-101F Integrator is normally sealed in foam which is then packaged in a cardboard carton. This carton should be handled manually.

Lift the carton observing the "This Side Up" labels. Do not use hooks. Use extreme caution when handling this equipment because it is extremely delicate.

2.4. Storage

If you are not going to install the Mini 11-101F Integrator now, it can be safely stored, with cover latches secured and hole plugs installed, at temperatures from –20° to +158° F (–20° to +70° C). Protect the instrument from moisture.

2.5. Inspection and Unpacking

The Mini 11-101F Integrator has been properly packaged at the factory for shipment and storage. Inspect all packages for damage before opening. If there is any evidence of shipping damage, notify the shipping carrier immediately.

Refer to the appropriate supplemental manual for inspection and unpacking procedures for optional equipment.

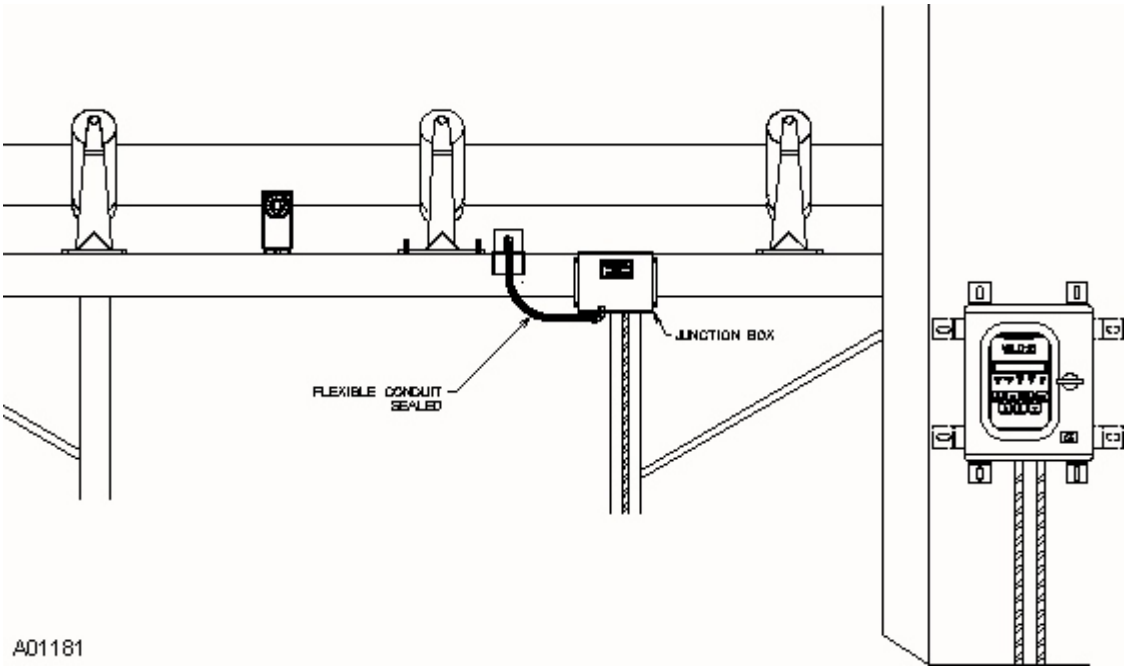
2.6. Installation

This section describes how to install the Mini 11-101F Integrator. It includes procedures for mounting, field wiring, and connecting incoming power to a field mount Mini 11-101F.

2.6.1. Site Selection

The ideal mounting location would be on a separate wall or beam in view of the scale. (See Figure 2-1) In some applications, it may be necessary to mount the Mini 11-101F Integrator further than 200 feet from the scale. In this instance, a special six-wire shielded cable is required for wiring the load cell and remote excitation sense lines.

Figure 2-1: Typical Integrator Installation



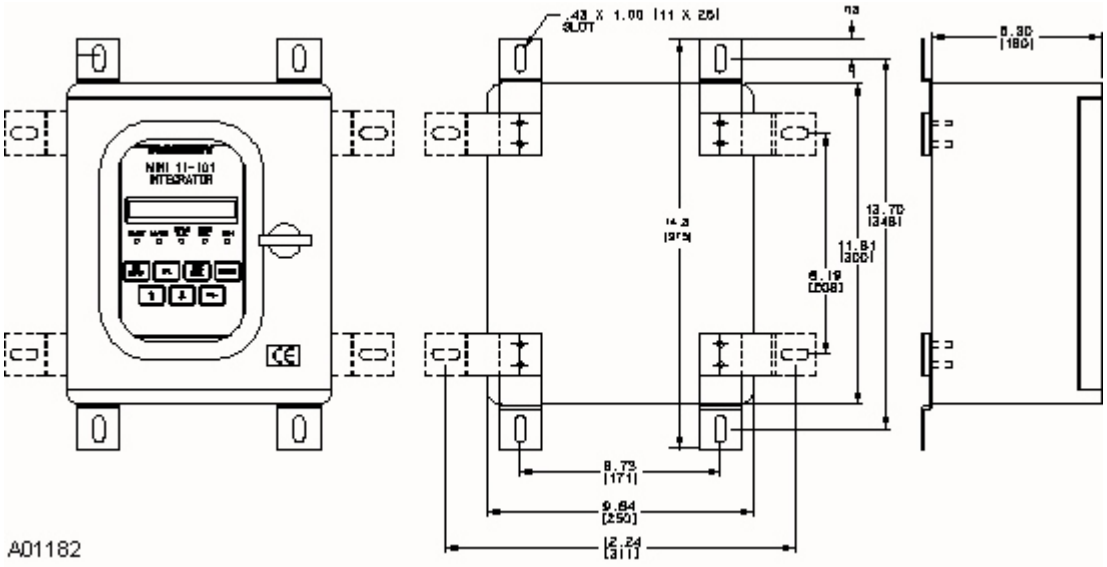
2.6.2. Mounting the Control Unit

Mount the Mini 11-101F Integrator to a rigid fixture in an area of minimum vibration. Mounting dimensions are shown in Figure 2-2. The Mini 11-101F Integrator is mounted with the door hinge on the left and at a height which allows comfortable viewing of the displays and access to the front panel, keypad, power switch, and field wiring terminals.

CAUTION

Make sure the mounting surface is flat so that the fiberglass enclosure does not twist or warp when the mounting bolts are tightened.

Figure 2-2: Outline and Mounting Dimensions



Follow this procedure to mount the integrator.

1. Bolt the enclosure to a flat, vertical surface using the four mounting holes on the back of the enclosure.
2. Punch the required conduit holes in the bottom of the enclosure for the power supply cable, coil cables, control wiring, communications cable(s), and any additional signal wires and conduit.

   Locate the holes in the appropriate areas of the enclosure to separate high and low voltages.

Note: Conduit fittings must have grounding terminals. Connect ground to internal chassis.

2.6.3. Wiring

All wiring, except as noted, is the responsibility of the customer. Follow the field-wiring diagram for your system or refer to the Field Wiring Diagram in Appendix C to connect system wiring.

CAUTION

All wiring must be done in accordance with field wiring diagrams, (see Appendix C) the National Electrical Code, and all local electrical codes.

Do no route coil cables through the same conduit with power cables or any large source of electrical noise.

2.6.3.1 Critical Wiring Conditions

Be sure to observe the following critical wiring conditions to ensure proper connection of your detector:

- Ensure main power is OFF.
- Earth ground all enclosures and conduits. A ground connection between all conduits is required.
- Connect the shields ONLY where shown.
- Check that all wires are tight in their connections.
- Never use a “megger” to check the wiring.
- All conduits should enter the bottom of the enclosure. Do not run conduit through the top or sides of the enclosure.
- Do not alter the length of cable supplied with the load cell.
- Use 4 conductor, 16 AWG, shielded if total distance from the scale is 200 feet or less.
- Use 6 conductor, 20 AWG, shielded if total distance from the scale is 201 to 3000 feet.
- Install jumpers in junction box.
- If multiple load cells are used, terminate load cell cables at the same points in the scale junction box.

2.6.3.2 Field Wiring Procedure

Follow all cable number specifications on the Field Wiring Diagram when connecting wiring to the motherboard. Use this procedure to wire the control unit.

1. Route incoming connections through the conduit hole in the bottom of the enclosure.
2. Leave enough loose wiring (about 8 in.) to allow wires to be moved without having to be disconnected.
3. Connect all alarm and indicator output wiring to the appropriate terminals on terminal block M2.
4. Connect the load cell and speed sensor to the appropriate terminals on M3 and M4. The communication cables are directly connected to the communication board. (M7)

2.6.3.3 Connecting Power to the Unit

CAUTION

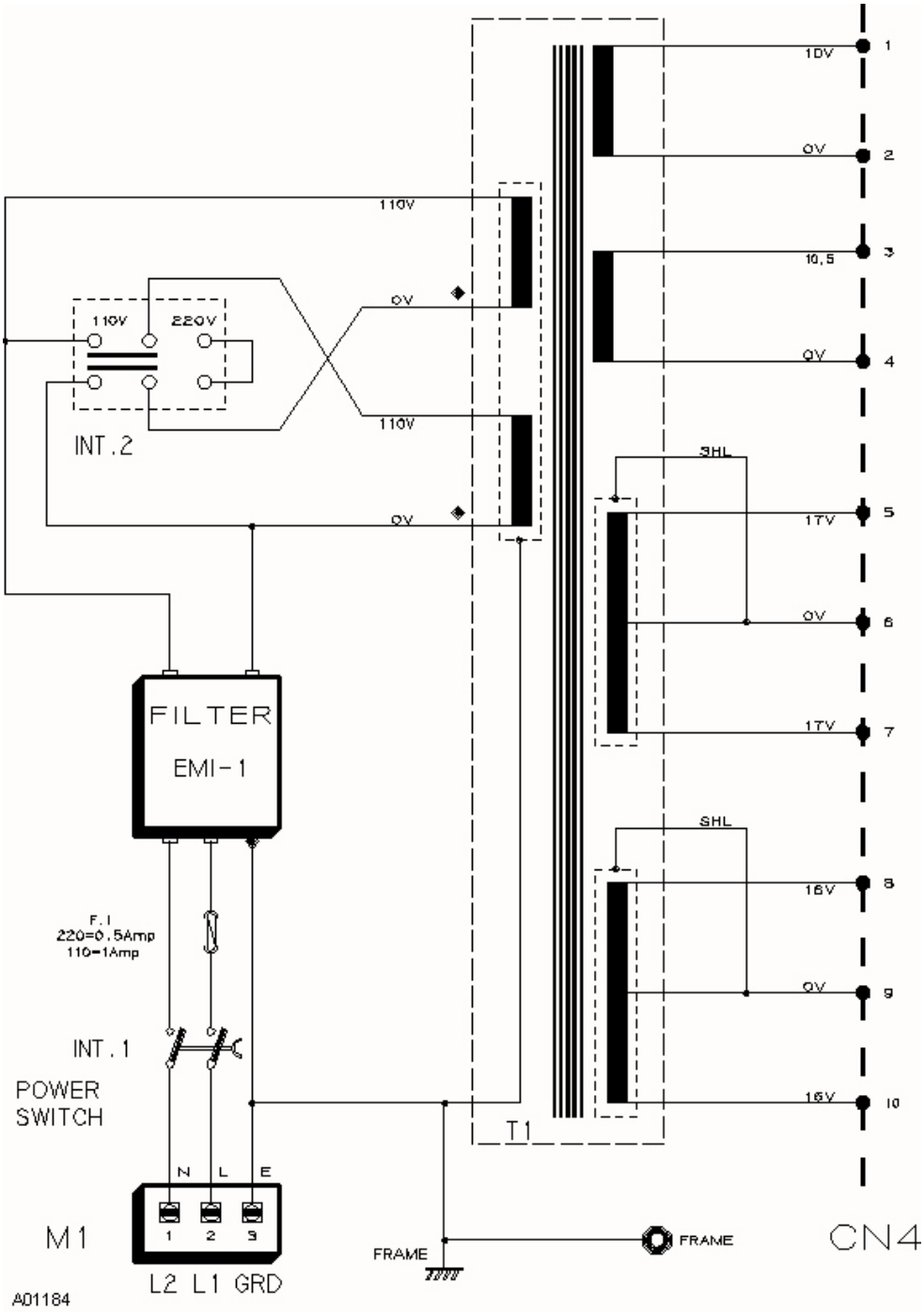
Do not apply power until you have read and understood this entire section. Improper connection may result in damage to your integrator.

- Verify the iinput voltage is correct with a voltmeter before you connect it to the unit. The red tag attached to the machine specifies the correct inut voltage for your particular unit.

Follow this procedure to connect incoming power to the integrator (see Figure 2-3).

1. Route incoming power wiring through a conduit hole on the bottom of the enclosure.
2. Connect line power to terminal strip M1 located on the input power module.
3. Leave enough loose wiring (about 8 in.) to allow wires to be moved without having to be disconnected.
4. Wire the safety ground terminal located on the right inside of the chassis.
5. Wire the HOT input power to the M1 terminal labeled L2.
6. Wire the NEUTRAL input power to the M1 terminal labeled N1.
7. Wire the ground to the M1 terminal labeled E3 (earth).

Figure 2-3: Input Power Connections



2.7. Configuring the Mini 11-101F Integrator

The Mini 11-101F Integrator is normally factory configured to the customer's specification. This section explains those configurations and the option you have to change selections.

2.8. Input Power Selection Switches

Switches and removable jumpers are described in this section. The default position is noted in each description and, in most cases, is not changed.

- 110 or 220 VAC is switch selectable by INT2 located on the input power module (see Figure 2-3).

  Default: 110 VAC

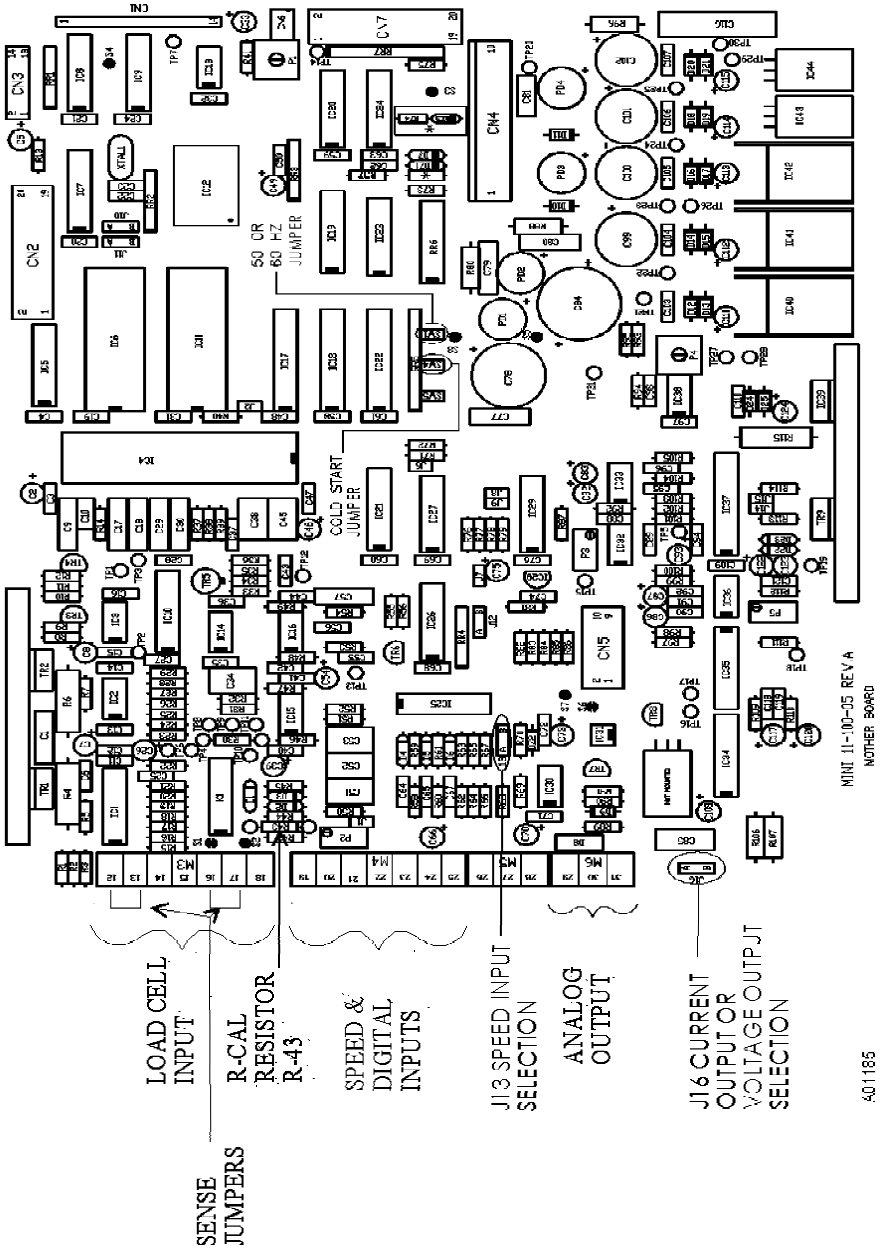
- 50 or 60 Hz is switch selectable SW1 located in the center of the motherboard (Figure 2-4) 50 Hz is the closed position and 60 Hz is the open position.

  Default: 60 Hz

- Speed input selection is controlled by jumper selectable J13 located on the lower, right hand center section of the motherboard.

  Default: position 'A' for speed inputs from Model 60–xx or 60–xxx Speed Sensors.

Figure 2-4: Motherboard



2.8.1. Load Cell Sense

If the distance between the load cell(s) and the Mini 11-101F is less than 200 feet, the load cell(s) are to be terminated with 4-conductor cable. The sensing of the excitation voltage is handled at the Integrator, with jumpers between M3-12 to M3-13 and M3-16 to M3-17.

When distances are between 200 and 3000 feet, 6-conductor cable is required. The sense leads and excitation is jumpered in the scale junction box (generally located within 20 feet of the load cell). Remove jumpers from M3-12 to M3-13 and M3-16 to M3-17 and install in junction box per your field wiring diagram.

2.8.2. General Purpose Digital Input Configuration

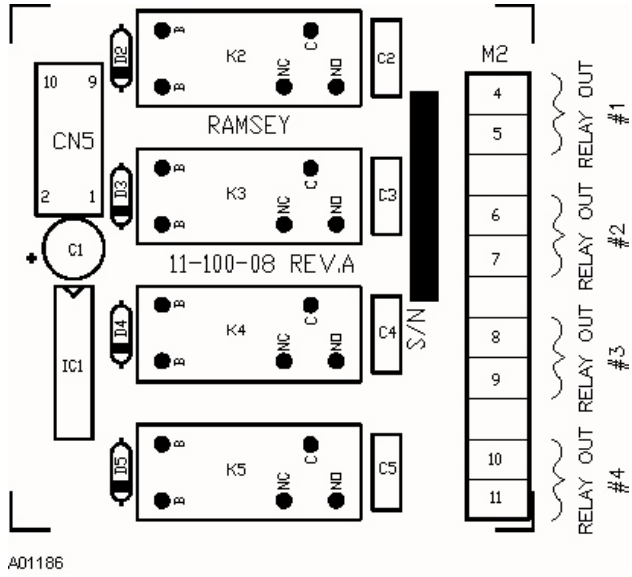
There are three user definable, general-purpose digital inputs on the relay board. These inputs are optically isolated, dry contact type configured N.O., 0.5 Amp at 250 VAC (see Figure 2-5).

The power supply for the general-purpose digital inputs is a +14 V unregulated DC supply.

The user definable input choices are:

- Not Used – Default No. 4 Input
- Clear Total – Default No. 2 Input
- Belt Running
- Clear Alarms – Default No. 3 Input
- Auto Zero
- Print – Requires optional communication board
- CAL Switch used during calibration

Figure 2-5: Relay Board



2.8.3. General Purpose Digital Output Configuration

There is 4-user definable, general purpose, digital outputs on the relay board. These inputs are optically isolated, dry contact type configured normally open (Figure 2-5). The maximum voltage is 240 VAC or 48 VDC, .5A.

The user definable output choices are:

- Not Used – Default
- Alarm – Default No. 2 Output
- Instrument Ready – Default No. 1 Output
- Low Rate
- High Rate – Default No. 4 Output
- Totalizer – Default No. 3 Output
- Fail

2.8.4. Analog Output Configuration

One jumper selectable flow rate analog output is available. Jumper J16, located on the bottom right hand side of the motherboard, selects between electrical current or voltage output (see Figure 2-4).

Available selections are:

Analog Output	J16
4-20 mA	"A" Default
20-0 mA	
20-4 mA	
0-20 mA	
0-10 VDC	"B"

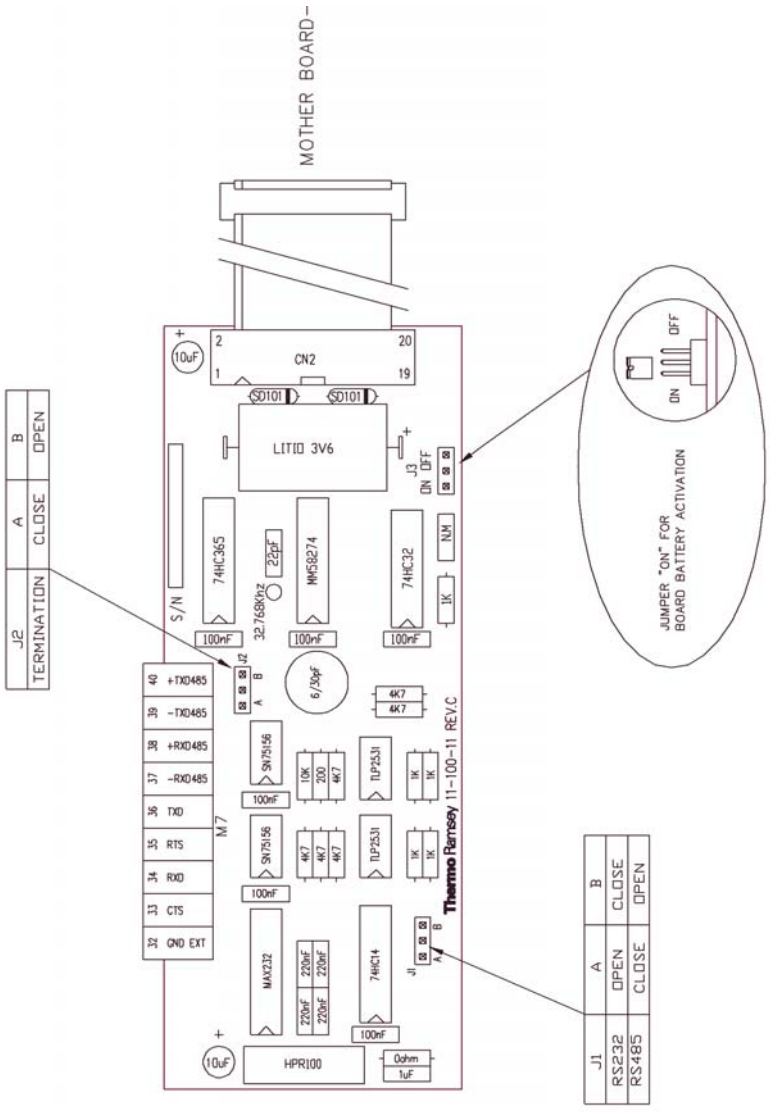
2.8.5. Optional Print Configuration

The print option requires the optional RS-232C/RS-423 communication board. The board is installed on the left hand side of the Mini 11-101F Integrator enclosure.

The settings for jumpers J2–J11 on the communication board for RS-232 or RS-423 must be set to the B position.

For RS-422, jumpers J2–J11 must be set to the A position. Default setting is the B position (see Figure 2-6.)

Figure 2-6: Communication Configuration



2.9. Power Up

CAUTION

Before applying power, Check the 110/220 VAC slide selector switch to make sure it is in the correct position for available power.

After the integrator has been properly mounted, wired, and configured power up the unit by turning on the main power.

The integrator powers up using values that were pre-programmed at the factory.

It is recommended the integrator is cold started (original factory defaults installed) prior to beginning the initial setup procedure. Refer to 4.5.4 Cold Start Procedure.

2.10. Initial Setup and Programming

If you are unfamiliar with the front panel layout, the keys and their functions, or how to enter data, please refer to Figure 1.2 and Section 1.5 Data Entry. Multifunctional keys and scroll keys on the integrator front panel are used to enter data and select choices on the setup menus.

Before calibrating the belt scale, the parameters recorded in Section 2.10.2 Recording Installation Parameters must be entered. After all the data is entered, the integrator automatically calculates an R-Cal calibration constant (Calcon) during the acquire test duration procedure.

2.10.1. Selecting the Language

At this menu, you can select the language to use with the Mini 11-101F Integrator. This menu option is found in the Input/Output menu. The choices for language are English or Spanish.

1. Press **RUN/SET-UP**

   PROTECTION displays
2. Press ↓ until **I/O DATA** displays
3. Press **ENTER**
4. Press ↓ until **LANGUAGE** displays
5. Press **ENTER**

   The default setting displays and flashes (default =English), press Enter again
6. Scroll to make your selection.
7. Press **ENTER** to confirm your choice.
8. Press **RUN/SET-UP** to return to **RUN** mode

2.10.2. Recording Installation Parameters

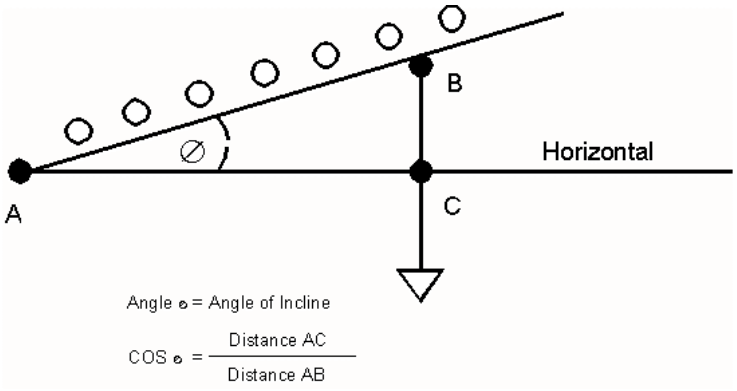
Following mechanical and electrical installation, you need to enter scale and calibration data specific to your installation. Determine the following installation parameters for your system and enter them in the last field of table Installation Parameters below before proceeding with integrator programming and belt scale calibration.

Table 2-1: Installation Parameters

Parameter	Definition	Scroll Setting Value
Scale Capacity	Determine the scale's capacity in English units (TPH, LB/HR, KG/HR)	
Load Cell Capacity	The load cell capacity is marked on the end of the load cell cable. The load cell capacity may be in pounds (lb) or kilograms (kg). Record the capacity of only one load cell	
Number of Load Cells	Enter the total number of load cells in the weighbridge.	
Load Cell Sensitivity (Cell mV/V)	Record the load cell sensitivity. Value is listed on the Scale Data Sheet. • 10-101R Scale = 2.0 mV/v • 10-30 Scale = 1.8 mV/v • 10-20 Scale = 3.0 mV/v	
Load Cell Resistance	The load cell resistance is indicated on the end of the load cell cable. Enter the resistance in ohms. For multiple module scales, enter the parallel resistance for the load cells. To calculate load cell resistance use the following formula: LCRES = (R1 x R2 x Rx) / (R1 + R2 + Rx)	
Lever Ratio	The lever ratio is the ratio between the weigh idler and the load cell. Ratios for the three most common belt scales are: 10–101R, all widths = 1.0 10–20–1, 18" to 36" width = 1.333 10–20–1, 42" to 72" width = 1.407 10–30, all widths = 1.0 As an aid to determining the ratio, use the following: Pivot to load cell / pivot to weigh idler	

Idler Spacing Scale Area	Measure the distances between the centerlines of the plus 1 (+1) and minus 1(–1) idlers on both sides of the conveyor (left and right). Add the two measurements together and divide by 4. Record the spacing in feet or meters. Fractions must be entered as decimal equivalents. If the two distances measured are not equal to each other within a 0.032 inch (1/32”), the scale is not properly installed. Refer to the belt scale installation manual provided.	
Number of Weigh Idlers	In most instances, there is only one weigh idler.	
Conveyor’s Angle of Incline	Measure the conveyor’s angle of incline to the nearest 0.1 degree. Record the degree of the angle. Refer to Figure 2-7 for information on how to measure the angle of an incline.	
Conveyor Belt Length	Using a long tape measure, measure the entire length of the belt. Measure to the nearest 0.1 foot.	
Conveyor Belt Revolutions	To calculate belt revolution, the belt must first make a minimum of three revolutions and have a 6-minute runtime. Determine the time necessary (in seconds) for the belt to make one complete revolution. Record the number of revolutions to use for calibration test length	
Test Length	The test duration uses the test length during setup. Test Length = Belt Length x number of test revolutions. (TL = BL x Rev’s)	
Test Weights	If static test weights were supplied with the scale, enter that total weight in pounds. The total weight is stamped on the test weight or test weight actuator	

Figure 2-7: Measuring the Angle of Incline



- Choose a convenient distance AB and measure it in inches.
- Hang a plumb line from B.
- Measure the horizontal distance from A to plumb line in inches (AC). Divide AC by AB to get COS.
- If the angle of incline in degrees is known, use the following table

Table 2-2: Angle of Incline

Angle	COS	Angle	COS	Angle	COS
0	1.00	6	.9945	12	.9781
1	.9998	7	.9925	13	.9744
2	.9994	8	.9903	14	.9703
3	.9986	9	.9877	15	.9659
4	.9976	10	.9848	16	.9613
5	.9962	11	.9816	17	.9563

2.10.3. Specifying Scale Data During Setup

The Mini 11-101F Integrator must be configured to your operating parameters. Several of these are recorded in Table 2-1.

If you are unsure or unfamiliar with how to enter data or navigate the menus from the integrator front panel, refer to Data Entry on page 1 - 10.

If you enter a value for a setup parameter that is outside of the valid range, the system displays an error message indicating the error. You must re-enter the data.

Note: Turn the belt scale conveyor belt on. Run the conveyor empty during set-up and calibration.

If you choose to use any default settings or there are no changes to be made to a specific menu item, press to scroll to the next menu item.

1. Press **RUN/SETUP**

   PROTECTION displays

2. Press ↓

   SCALE DATA displays

3. Press **ENTER**

   SCALE UNITS displays

The selections used during this set-up procedure are listed below. Press to move from one menu item to the next.

- Scale Units
- Decimal Place
- Scale Capacity
- Lcell cap
- Cells Number

There are other menu items in the scale data menu. It is not necessary at this time to enter Low Rate Set, High Rate Set, Rate Alarm Delay, AZT Range, Limit AZT, and Deadband. These entries can be made at any time after initial setup and calibration.

2.10.3.1 Scale Units

Scale units are the units used to display the master total. When you select a scale unit, you also select the units used for the rate display. Default scale units are Tons. Rates are in units/hour. Scroll to **SCALE UNITS** and select the units you are using for your particular scale.

The default setting for **SCALE UNITS** is Tons. Available selections for **SCALE UNITS** and the way they are displayed are listed below

Table 2-3: Scale Units

Units	Display	Weight	Length	Rate
Pounds	Lb	Lb	Ft	Lb/h
Tons	TON	Lb	Ft	TPH
Long Tons	LTN	Lb	Ft	LTph
Tons	t	kg	m	t/h
kg	kg	kg	m	kg/h

Follow this procedure to change the default value of the Scale Units.

1. With **SCALE UNITS** displayed, press **ENTER**

   The default value displays

2. Press **ENTER**

   The display flashes

3. Press ↓ to scroll to the units used for your setup
4. Press **ENTER** to save your selection
5. Press ↓ to move to the next menu item

Note: If the LED display continues to flash, press ENTER until the flashing stops. Selections are not saved until the LED stops flashing.

2.10.3.2 Decimal Place

The **DECIMAL PLACE** menu lets you choose the number of decimal places to be displayed. Select the number of decimals. The default value for the **DECIMAL PLACE** is 1.

Follow this procedure to change the default decimal place setting.

1. Press **ENTER**

   Decimal setting displays

2. Press **ENTER**

   The display flashes

3. Press either of the arrow keys until the decimal is located where you want it.

Note: During zero and span calibration, the resolution of the displayed total is 10 times greater than it normally would be.

4. Press **ENTER** to save your selection.
5. Press ↓ to move to the next menu item

Min: 0
Max: 3 (.000)
Default: 1 (.0)

2.10.3.3 Scale Capacity

At the Scale Capacity menu, enter the capacity of your scale in weight/hour. The default value for scale capacity is 200.0. Use the following procedures to change the default value.

1. With **SCALE CAPACITY** displayed, press Enter
2. Press **ENTER**

   The display flashes

3. Press the arrow keys to enter your scale capacity.
4. Press Enter to save your selection
5. Press ↓ to move to the next menu item.

Min: 1.0
Max: 100,000.0
Default: 200.0

2.10.3.4 Load Cell Capacity

Enter the load cell capacity on the LCELL CAP menu. Enter the capacity of only one load cell. All load cells will be the same size. Use the following procedures to enter the load cell capacity.

1. With **LCELL CAP** displayed, press Enter
2. Press **ENTER**

   The display flashes
3. Press the arrow keys to enter the load cell capacity.
4. Press **ENTER** to save your selection
5. Press ↓ to move to the next menu item.

Min: **10.00**
Max: 15000.00
Default: 250.00

Note: If the unit measure of the load cell is tons (Tons) or pounds (Lb), then the display cell size is pounds (Lb). If the unit of measure is tons (t/metric ton) or kilograms, (kg) the display cell size is kilograms (kg). (Convert as necessary 1 kg = 2.2 lb)

2.10.3.5 Number of Load Cells (Cells Number)

If there is more than one load cell being used, enter the total being used on the **CELLS NUMBER** menu. Use the following procedures to enter the number of load cells.

1. With **CELLS NUMBER** displayed, press Enter
2. Press **ENTER**

   The display flashes
3. Press the arrow keys to enter the number of load cells.
4. Press **ENTER** to save your selection.
5. Press **RUN/SET-UP** to return the integrator to run mode.

Min: 1
Max: 4
Default: 1

Note: See Appendix A for the remainder of the Scale Data scrolls. They are considered features and are not necessary for initial set up.

2.10.4. Specifying Calibration Data During Setup

Using the information gathered and entered in Section 2.8 Installation Parameters, you will now specify the calibration data. You must perform this step before proceeding to the calibration procedures in Chapter 3.

2.10.4.1 Selecting the Calibration Method

There are two methods of performing an automatic span calibration on the integrator, electronic res (R-Cal), and test weights. Select which method of automatic span calibration you will be using as your normal procedure. The method you select determines the screens that display in the calibration section. If you choose to use weights or chains in the calibration procedure use the following procedure to manually calculate the Calcon.

** Formula for use with 10-101R scale only. Consult factory for other scale models.

$$\text{ChainCalcon} = \frac{\left[\left(\frac{\text{chainlb}}{\text{ft}}\right)\right]\text{WTL}}{\text{K}}$$

$$\text{StaticWeightCalcon} = \left[\frac{\left(\frac{\text{staticwieghtlbs}}{\text{WS}}\right)\text{WTL}}{\text{K}}\right]$$

Where:

WTL = belt length x revolutions

WS = Weigh Span (number of weigh idlers x idler spacing

K = 2000 lbs – Standard ton

2240 lbs – Long Ton

2204 lbs – Metric Ton

1. Press the **RUN/SET-UP**

   PROTECTION displays

2. Press ↓ until **CAL DATA** displays
3. Press **ENTER**

   The first **CAL DATA** screen appears.

4. Use the arrow keys to select **WGHT OR CHAINS** or **ELECTRONIC RES**
5. Press **ENTER** to save the selection.

Note: If the scale carriage is not a 10-101R, a different test weight Calcon formula may be required (see Appendix A).

2.10.4.2 Defining Electronic Res (R-Cal) Parameter

If **ELECTRONIC RES** has been selected, press the ↓ and follow this procedure to have the system automatically calculate and install the R-Cal calibration constant.

If **WGHT** or **CHAINS** was selected, skip to Chapter 3, paying special attention to the procedures in Section 3.4.2.2 Auto Span Calibration Using Test Weights or Chains.

R-Cal Mode

The integrator automatically calculates and installs the Electronic Res (R-Cal) calibration constant if Automatic Calcon is selected. The following scale parameters must be entered and the belt test length entered in the CAL (Calibration) scroll to enable automatic calculations of the R-Cal calibration constant.

1. Press ↓, until **RCAL MODE** displays
2. Press **ENTER**
3. Select the method you wish to use **AUTOMATIC** or **MANUAL.**

   Stop here if you selected manual calculation. You will have to manually calculate the calibration constant and enter it during the calibration of the Mini 11-101F. (See Factoring Test Weights/Chains Calcon after Span Calibration with Material on page 3 - 11.)

   If you select **AUTOMATIC**, complete the remaining steps using the information gathered in Table 2-1 Installation Parameters.
4. Press ↓ to move to the next menu item.

Load Cell Sensitivity

Enter the load cell sensitivity on the Cell Mv/V menu. Sensitivity of the load cells used are listed below:

- 10-101R Scale = 2.0 mV/v
- 10-30 Scale = 1.8 mV/v
- 10-20 Scale = 3.0 mV/v

1. **CELL MV/V** displays
2. Press **ENTER**

   The display flashes
3. Press the arrow keys to enter the load cell sensitivity.

Note: If you are using two or more load cells, average the sensitivity. Refer to Table 2-1 Installation Parameters.

4. Press Enter to save your selection.
5. Press ↓ to move to the next menu item.

Min: 1.000 mV/V
Max: 3.500 mV/V
Default: 1.800 mV/V

Cell Resistance

At **CELL RESIST,** enter the resistance of the load cell(s). The resistance for the load cell has been recorded on the System Data Sheet in the front of your belt scale manual. It is also stamped on the load cell cable. Use the following procedure to enter the load cell resistance.

1. **CELLS RESIST** displays
2. Press Enter

   The display flashes
3. Press the arrow keys to enter the cell resistance.

Note: This is the parallel resistance if two or more load cells are used. Refer to Table 2-1 Installation Parameters.

4. Press Enter to save your selection.
5. Press ↓ to move to the next menu item.

Min: 50.000 ohms
Max: 1000.000 ohms
Default: 350.000 ohms

Calibration Resistance

Enter the resistance of R43 in ohms of the R-Cal resistor installed in your Mini 11-101F Integrator on the **CALIBRATION RES** menu. See the system data sheet for exact resistance.

1. **CALIBRATION RES** displays
2. Press E**NTER**

   The display flashes
3. Press the arrow keys to enter the collaboration resistance.
4. Press **ENTER** to save your selection.
5. Press ↓ to move to the next menu item.

Min: 50,000 ohms
Max: 1000,000 ohms
Default: 165,000 ohms

Lever Ratio

The lever ratio is the ratio between the weigh idler and the load cell. See the scale manual for exact dimensions entered on the Lever Ratio menu. Use the following procedures to enter the lever ratio.

Weighbridge	Ratio
10-101 R – All widths	1.0
10-20-1 18” to 36” width	1.33
10-20-1 42” to 72” width	1.407
10-30 – All widths	1.0

1. **LEVER RATIO** displays
2. Press **ENTER**

   The display flashes
3. Press the arrow keys to enter the lever ratio.
4. Press **ENTER** to save your selection.
5. Press ↓ to move to the next menu item.

Min: 0.001
Max: 2.000
Default: 1.000

Idler Spacing

At the **IDLER SPACING** menu, enter the scale area idler spacing in feet or meters. Fractions cannot be entered. All measurements must be in decimal. Example: 42 ½ inch spacing = 3.542 feet. Use the following procedures to enter the idler spacing.

1. **IDLER SPACING** displays
2. Press **ENTER**

   The display flashes
3. Press the arrow keys to enter the idler spacing.
4. Press **ENTER** to save your selection.
5. Press ↓ to move to the next menu item.

Min: 0.001 ft
Max: 999.999 ft
Default: 3.000 ft

Idlers Number

At the **IDLER NUMBER** menu, use the following procedures to enter the number of weigh idlers.

1. **IDLER NUMBER** displays
2. Press **ENTER**

   The display flashes
3. Press the arrow keys to enter the number of idlers.
4. Press **ENTER** to save your selection.
5. Press ↓ to move to the next menu item.

Min: 1
Max: 6
Default: 1

Conveyor Angle

At the **CONVEYOR ANGLE** menu, use the following procedures to enter the belt conveyor's angle of incline.

1. **CONVEYOR ANGLE** displays
2. Press Enter

   The display flashes
3. Press the arrow keys to enter the conveyor angle.
4. Press **ENTER** to save your selection.
5. Press **RUN-SET-UP** to return the integrator to run mode.

Min: -25.0 degrees
Max: +25.0 degrees
Default: 0.0 degrees

Note: Automatic calculation is not complete until the Acquire Test Duration procedure has been performed.

2.10.5. Acquiring the Test Duration

After entering the constant data, run an acquired test duration. On completion, the integrator automatically calculates the R-Cal span calibration constant based on the conveyor and scale data entered. It is not necessary to do another test duration unless the belt length changes substantially or the belt is replaced.

Test Duration is an exact total of pulses from the speed sensor proportional to feet of belt traveled. The belt must be running at maximum speed.

To begin acquiring test duration, mark a reference point on the belt clearly visible from the integrator, with either crayon or spray paint. Run the conveyor belt at maximum speed with no material or use a stopwatch.

1. Press **CAL**

   ZERO CALIBRATION displays

2. Press ↓ until **TEST DURATION** displays
3. Press **ENTER**

   LENGTH displays and flashes

4. Press **ENTER**

   BELT LENGTH is displayed

5. Enter test length (belt length x test revolutions, refer to Table 2-1. *Installation Parameters*)

   Max Length = 10,00.00 ft

   Min Length = 1.00 ft

6. Press **ENTER** to save your selection
7. Press ↓ to acquire test duration.
8. Press **ENTER** to start counting when belt mark passes a known reference point.

Note: If **POST SPAN** displays before **TEST DURATION** in the menu it is because a calibration with material was done and not completed. Just scroll past this to reach **TEST DURATION**.

---

9. Count the conveyor belt revolutions.
10. When the number of revolutions, equal to test conveyor belt revolutions as listed in Table 2-1. *Installation Parameters*, passes the reference point, press **ENTER** to stop the counter.

    Pulses are displayed press **ENTER** to acquire.

    ACQUIRE displays, which indicates the test duration number has been acquired. The test duration number is used for Auto Zero and Auto Span.

11. Press Run/Set-up to return to Run mode.

Table 2-4: R-Cal Parameter Overview

Menu Item	Definition	Min	Max	Default
CALIBRATION MODE	Selects the calibration method: • Electronic Res (R-Cal) – Default • Weights or Chains			
RCAL MODE	The integrator automatically calculates and installs the Electronic Res (R-Cal) calibration constant if Automatic Calcon is selected. The scale parameters must be installed and the belt parameters in the Test Duration scroll installed to enable automatic calculations Available selections are: • Manual Calcon • Automatic Calcon – Default			
CELL MV/V	The cell sensitivity in mV/V. The actual sensitivity is listed on the system data sheet.	1.000 mV/V	3.500 mV/V	1.800 mV/V
CELLS RESIST	The resistance for the load cell has been recorded on the System Data Sheet in the front of your belt scale manual. It is also stamped on the load cell cable. Enter the ohms for the load cell(s)	50.000 ohms	1000.000 ohms	350.000 ohms
CALIBRATION RES	The resistance in ohms of the R-Cal resistor installed in your integrator. See the System Data Sheet for exact resistance.	50,000 ohms	1,000,000 ohms	165,000 ohms
LEVER RATIO	The level ratio is the ratio between the weigh idler and the load cell. See the scale manual for exact dimensions **Weighbridge** **Ratio** 10-101R – All widths 1.0 10-20-1 – 18” – 36” width 1.33 10-20-1 – 42” to 72” width 1.407 10-30 – All widths 1.	0.0001	2.000	1.000

IDLER SPACING	Scale area idler spacing in feet or meters. Fractions cannot be entered. Example: 42 ½" spacing = 3.542 feet	0.0001 ft	999.999 ft	3.000 ft
IDLER NUMBER	The number of weigh idlers	1	6	1
CONVEYOR ANGLE	The belt conveyor's angle of inclination	-25.0 degrees	+25.0 degrees	0.0 degrees
CALCON RCAL	The installed R-Cal Calcon can be factored or changed after automatic calculation if desired.			

2.11. Introduction to Calibration

Once you have programmed the Mini 11-101F with the set-up data, you need to calibrate the instrument. Three calibration procedures must be performed to bring your Mini 11-101F to an operational state.

1. Auto Zero Calibration
2. Span Calibration
3. Post Span Calibration (if the span calibration is performed with weights, chains, or material).

Follow the procedures in Chapter 3 of this manual to calibrate your scale.

Chapter 3
Operations

This chapter provides operating procedures for the Mini 11-101F Integrator. It includes procedures you can initiate from the Run Menu, calibration procedures, handling alarms, and setting up protection levels

3.1. Overview

The Mini 11-101F Integrator is a menu-driven machine that allows you to access all setup, test, and calibration parameters from the front panel. You select and display menu scrolls by pressing the function keys (**RUN/SET-UP**, **CAL**, **RATE TOTAL**, and **ENTER**) directly, then using the ↑, ↓ and → keys on the front panel to enter data. If you are unfamiliar with menu scrolls or data entry refer to *Data Entry* in Section 1.5.

Optional menu scrolls and selections are available only if the option has been installed. If the Mini 11-101F is password protected, you must enter the appropriate password before you will be allowed to make changes or perform routine calibrations. Menus may be viewed without entering the password, but no entries are allowed.

3.2. Run Menu Procedures

This section describes the Mini 11-101F Run Menu and the information that can be displayed on it. It also provides procedures for operations initiated from the Run Menu.

The Run menu is the normal mode of operation. At any time, pressing Run/Set-UP returns the integrator to the Run mode, even if calibration or some other function is in progress.

Scroll viewable run information by pressing **RATE/TOTAL**. The selectable displayed information in the Run menu that can be viewed is:

- **FLOW RATE** - The rate at which bulk material is being conveyed and delivered. This displays while the integrator is operational.
- **MASTER TOTAL** - The aggregate of tons totalized by the Integrator since installation. This number cannot be cleared.
- **RESET TOTAL** - Displays a totalized quantity. You press Enter while the Reset Total is on display, the next display states Clear Total?. Pressing Enter again clears the Reset Total.

- **PRINT TOTAL** - If the optional COMM board is installed a report is printed. The format on the report depends on set up. The default format is as follows:

  DATE 09-19-00

  TIME 02:40:35

  RATE 133.5 Ton

  MASTER TOTAL 239961.2 Ton

  RESET TOTAL 0

- An optional customer defined report is also available. It includes the above data plus three alphanumeric strings printed in a position the user can define by entering row and column numbers for each item to be printed. (See A.2.6 Printer Scroll (Optional) Menu).
- **ALARMS** - This menu item tells you the alarms that are currently pending. When you select Alarms and press enter, if No alarms displays this indicates there are no alarm conditions present.

  If one or more alarms exists, an alarm message is displayed for each. Scrolling between alarms is done using the down arrow key.

  Each alarm can be reset, if the alarm condition has cleared, by pressing the Enter key when the given alarm message is on the screen. To reset all the alarms, press enter until the no alarms message is displayed.

  If pressing enter does not clear the alarm message, this means the alarm condition still exists.

3.3. Handling Pending Alarms

Table 3-1 details a few of the more common alarm situations and the action to be taken to clear the alarm. This is by no means an all-inclusive list, but does cover some of the more common alarm issues.

Table 3-1: Alarm Messages

Alarm Number	Alarm	Meaning/Action
1	Low Rate	The alarm output becomes active when the material flow rate falls below the preset low limit. Range for low flow alarm is 0% - 100% of scale capacity. The default setting is 10%
2	High Rate	The alarm output becomes active when the material flow rate exceeds the preset high limit. Range for the high flow alarm is 0%-150% of scale capacity. The default setting is 100%.
3	Remote Counter Overflow	If the remote counter (pulse output) has lagged behind the master totalizer by more than 250 counts, this alarm will become active. This indicates the output pulse width is too large for the count rate, or the pulse

		output divide ratio is too small. Example: If the count rate is 5000.0 TPH, the pulse frequency will be 13.88 pulses or counts per second. This means the maximum time for a complete pulse (on time and off time) cannot exceed 73 ms. If the pulse output pulse width is set to 100 ms, at scale capacity the output buffer would overflow the 250 count limit in about 180 seconds or three minutes. The pulse output should be set to a value less than 72 ms or the output divide ratio set to 10 (each pulse output would represent 1.0 tons instead of a typical .1 ton
4	Belt Pulse Counter Overflow	The maximum input frequency from a belt speed sensor is 2.0 kHz. A frequency greater than this value cannot be interpreted by the integrator causing a belt pulse overflow alarm.
5	Cold Start	The system has detected the loss of the setup data after power was removed. • The instrument needs to be se up and calibrated • Replace either the motherboard or the battery
6	Load Cell Fail	The system has detected an error on the load cell signal indicating either a negative voltage or an excessively high voltage (Refer to instrument specifications for limits.) Do the following: • Check the load cell connections • Check the load cell • See also Section 4.5.3 Load Cell Excitation and Signal Voltage
7	Maximum Zero Correction	The maximum allowable change in zero using the Auto Zero function is 10% of scale capacity. A change grater than this amount indicates a major error in the system. Completion of scale area physical inspection and loadcell test procedure is recommended. A “Cold Start” and re-calibration of the system may be necessary.

8	Math Error	A divide by zero or overflow error was encountered during internal calculations. This message indicates that some abnormal dimensional parameter has been entered in setup. • Check setup data

3.4. Calibration

Prior to running a zero or span calibration, several conveyor and scale constants must be entered in the Scale Data and Cal Data Scroll. See Recording Installation Parameters on page 2-15 for required entries.

You will need to perform all of the data entry when you are setting up the system. Several constants required for system operation are installed by these initial calibrations.

You will also need to perform the Test Duration prior to the zero and span calibration procedures (see 2.10.5 Acquiring the Test Duration). If this has been completed at the time of set up, it is not necessary for subsequent zero or span tests.

Routine calibration consists of periodic zero and span calibration procedures. These procedures make fine adjustments to compensate for material build up, mechanical wear, and environmental effects on the conveyor.

A calibration log should be completed and maintained whenever a zero or span test is performed. (See 3.4.4 Keeping a Calibration Record.)

Note: During zero and span calibration, the resolution of the displayed total is 10 times greater than it normally would be.

3.4.1. Zero Calibration

A zero calibration establishes the zero constant to be used by the Mini 11-101F for calibrating the scale. This calibration can be automatic or manual. Auto Zero uses a calculated zero constant and re-calculates it to automatically adjust the weight signal to provide a zero indication at empty belt conditions. Manual Zero requires you to enter the zero constant.

3.4.1.1 Auto Zero

Auto Zero allows automatic adjustment of zero to produce a zero accumulation when no material is passing over the belt scale. It is specifically intended for zeroing out the belt and its variations in weight over a period specified by the Test Duration.

Make sure the belt is empty and running at maximum speed. If the belt has not been run prior to Auto Zero calibration, it should be run for at least thirty (30) minutes.

Follow this procedure to have the system calculate the auto zero constant:

1. Press the Cal
2. Press Enter, the Mini 11-101F begins calculating auto zero.

   Accumulation continues and terminates automatically at the end of the test duration. The accumulated tons flash on the display. Record this number to determine the zero error.

   Accumulation of tons received during auto zero does not increment actual material totals.
3. Press **ENTER**

   ERR ± XXX.X% displays

   Record this on the calibration record.
4. Press **ENTER**

   ZERO XXXX displays, this is the new zero reference number. Record this as the new zero number on the calibration record.
5. Press **ENTER**

   ACQUIRED displays indicating the auto zero has been acquired.

   Press **RUN/SET-UP** and the recomputed zero number is installed

3.4.1.2 Manual Zero

Manual zero calibration allows you to make a direct change to the zero, providing you know the zero constant. Follow this procedure to manually enter the zero constant.

1. Press the **CAL**
2. Press ↓ until Zero displays.
3. Press **ENTER** to display the current value
4. Press **ENTER**, the display flashes
5. Press the arrow keys to enter the zero constant.
6. Press **ENTER** to save your selection.
7. Press **RUN/SET-UP** to return to **RUN** mode.

3.4.2. Span Calibration

A span calibration tests the accuracy of a scale when a known or simulated load is applied to the scale and results are compared to a known reference weight to calculate a span number. Span is the number automatically or manually adjusted to make the displayed weight equal to the reference weight or calibration constant.

Span calibrations on the Mini 11-101F can be automatic or manual. Auto Span allows automatic adjustment of span when calibrating to a known weight standard. Manual Span requires you to enter the span number.

Auto Span allows automatic span adjustment so that for a given simulated belt loading, the total accumulated weight over specified test duration equals the calibration constant (Calcon). There are four ways to calculate span:

- Test Weights
- Calibration Chain
- Electronic Resistance (R-Cal)
- Material

3.4.2.1 Auto Span Calibration Using R-Cal Input

The R-Cal method shunts a resistor across the load cell's bridge circuit to simulate an actual applied weight.

This is the quicker, simpler method of automatic span calibration. Run the belt empty at maximum speed. If Auto Zero has not been performed, complete Section 3.4.1 Zero Calibration before proceeding.

1. Press **CAL**
2. Press ↓

   SPAN CALIBRATION displays
3. Press **ENTER**

   CALCON RCAL displays
4. Press ↓

   READY TO START displays
5. Press **ENTER** to begin the span calibration.

   Accumulation continues and terminates automatically at the end of the established test duration.
6. The accumulated tons display and flash. Record this number on the calibration record.
7. Press **ENTER**

   ERR ±XXX.X% displays. This is the "as found error" in percent of Calcon. Record this number in the calibration record.
8. Press **ENTER**

   SPAN XXXX displays, this is the new span number. Record this number as new span.
9. Press **ENTER**

   ACQUIRED DISPLAYS, indicating the auto span has been acquired.
10. **PRESS RUN/SET-UP** to return the integrator to run mode.

Note: The Auto Zero and Auto Span calibrations should be performed before attempting a material calibration. Repeatability can be tested by completing several tests in a row with or without acquiring new values for each test.

3.4.2.2 Auto Span Calibration Using Test Weights or Chains

If you are calibrating with static weights or chains you must first set it up in Selecting the Calibration Method in Section 2.10.4.1. If you have not completed the procedures, go back and do so now.

The test weights method uses certified test weights as a test load that is then used as the simulated weight for automatic span calibration.

The test chain method uses a roller chain that has a known weight per unit length (lbs/ft). The chain is placed on top of belt and secured at each end. The weight over the weigh span simulates belt loading.

When calibrating with static weights or chains, stop the belt, apply either standard, and restart the belt.

Follow this procedure to calibrate with weights or chains.

1. Press Cal
2. Press ↓

   SPAN CALIBRATION displays
3. Press Enter

   CAL WGH OR CHAIN displays
4. Press **ENTER** and use the arrow keys to enter the calculated calibration constant for either standard.
5. Press **ENTER** to save the constant
6. Press ↓
7. **READY TO START** displays
8. Press **ENTER**

   Accumulation continues and terminates automatically at the end of the test duration.
9. The accumulated tons display and flash. Record this number.
10. Press **ENTER**

    ERR ±XXX.X% displays

11. Press **ENTER**

    SPAN XXXX displays

12. Press **ENTER**

    ACQUIRED displays, indicating the span number has been acquired.

13. Stop the conveyor belt and remove any weights or chains

14. Press **RUN/SET-UP** to return the integrator to run mode

3.4.2.3 Auto Span Calibration Using Material

Material calibration is a machine-directed procedure for calibrating the Mini 11-101F Integrator using the material the scale will be weighing. The calibration is done by running a known quantity of material over the scale for a period of time.

The material used for this calibration must be pre weighed or post weighed to a known accuracy on a static scale to obtain the actual weight of the material (the reference weight).

The R-Cal or test weight Calcon should be factored following a material test span calibration. The factored Calcon can then be used for all routine auto span calibrations.

Follow this procedure to determine the span number using material.

1. Press Cal

2. Press ↓ twice

   MATL CALIBRATION displays

3. Press **ENTER**

   Sets the **CAL TOT** to zero and enables it to totalize the test load.

4. Run sufficient material across the scale at the normal feed rate, preferably between 50 and 100 percent of the rated capacity.

5. Press **ENTER** to stop the acquisition of the calibration total.

6. Press **ENTER**

   The calibration total is stored, normal totalization resumes, and acquired displays.

7. Press **RUN/SET-UP**

   The symbol 'M' will be blinking on the left side of the rate display indicating a material calibration has been started but not completed.

Continue with the next procedure to complete material calibration.

Material Post Span Procedures

This procedure must be run after material calibration. It compares belt scale totalized weight with static weight of the same material to compute a new span value.

1. Press **CAL**
2. Press ↓ three times

   POST SPAN displays

Note: Post Span does not display unless a Material Test is being run.

---

3. Press **ENTER**

   REF WEIGHT displays
4. Press **ENTER**

   XXXXXXXXX displays previous totalized test load
5. Press **ENTER**
6. Press the arrow keys and enter the actual weight of the test load.

   The weights must be expressed in the same units as you designated in 2.10.3.1 Scale Units (tons, lbs, kg).
7. Press Enter to save your selection.
8. Press ↓.

   The calculated span error displays: **ERR ±XX.X%**
9. Press **ENTER**

   The recomputed span displays: **SPAN XXXXXXXX**
10. Press **ENTER**

    ADD TOTAL ? displays

Note: Pressing Run/Set-up at this point does not add the test load value to master total. A new span is acquired.

---

11. Press **ENTER**

    ACQUIRED displays indicating the recomputed span has been installed. The test load is added to the master total.
12. Press **RUN/SET-UP** to return the integrator to Run mode.

3.4.2.4 Factoring R-Cal after Span Calibration with Weights or Material

This procedure is executed only if a span calibration using test weights or material has been done and R-Cal has not yet been factored.

The calculated R-Cal calibration constant cannot be factored or changed with automatic Calcon selected.

Note: The Mini 11-101F will not alter the span based on the results of this procedure. The system assumes the span is correct based on a test weight or material calibration. This procedure simply acquires the R-Cal factor, which can then be used to check and change the span between test weight or material calibrations.

Use the following procedures to begin factoring R-Cal.

1. Press **RUN/SET-UP**
2. Press the ↓ twice

   CAL DATA displays
3. Press **ENTER**

   CALIBRATION MODE displays
4. Press **ENTER**

   ELECTRONIC RES (default) displays or **WGH OR CHAIN** displays
5. Press **ENTER**, and press ↓

   RCAL MODE displays
6. Press **ENTER** and select **MANUAL CALCON**
7. Press **ENTER**

Note: Be certain the belt is warmed, running empty, and the scale is properly zeroed. (Refer to Section 3.4.1.1 Auto Zero to perform an auto zero.)

Note: The calculated R-Cal cannot be factored or changed with Automatic Calcon selected.

8. Press **CAL** and press ↓

   SPAN CALIBRATION displays

9. Press **ENTER**

   CALCON RCAL displays

10. Press ↓

    READY TO START displays

11. Press **ENTER**

    ±XXXXXXXXX displays, and accumulation continues and terminates automatically at the end of the test duration.

12. The accumulated tons flash in the display

    Record the displayed number for the new **CALCON RCAL**

13. Press **RUN/SET-UP** to return to Run mode.

14. Press **CAL** and ↓ until

    SPAN CALIBRATION displays

15. Press **ENTER**

    CALCON RCAL displays

16. Press **ENTER** and use the arrow keys to enter the new Calcon R-Cal. Press **ENTER** to save your selection.

17. Press **RUN/SET-UP** to return the integrator to Run mode.

3.4.2.5 Factoring Test Weights/Chains Calcon after Span Calibration with Material

This procedure is executed only if a span calibration using test weights or material has been done and Calcon has not yet been factored.

Be certain the belt is warmed, running empty, and the scale is properly zeroed. (Refer to Section 3.4.1.1 Auto Zero to perform an auto zero.)

1. Press **RUN/SET- UP**
2. Press the ↓ until

   CAL DATA displays
3. Press **ENTER**, select **WEIGHT OR CHAINS**, press **ENTER** to save your selection.
4. Stop the belt conveyor, apply the weight standard, and restart the belt conveyor.
5. Press **CAL** and press ↓ until

   SPAN CALIBRATION displays
6. Press **ENTER**

   CAL WGH OR CHAIN displays
7. Press ↓

   READY TO START displays
8. Press **ENTER**

   ±XXXXXXXXX displays, and accumulation continues and terminates automatically at the end of the test duration.
9. The accumulated tons flash in the display, record the displayed number for the new Calcon.
10. Press **CAL**
11. Press ↓

    SPAN CALIBRATION displays
12. Press **ENTER**

    CAL WGH OR CHAIN displays
13. Press **ENTER**

    The previous Calcon displays
14. Press **ENTER** and press the arrow keys to enter the new Calcon.
15. Press **ENTER** to save your selection
16. Press **RUN/SET-UP** to return the integrator to Run mode.

3.4.2.6 Manual Span Calibration

Manual span calibration allows you to make a direct change to the span, providing you know the span constant.

Note: If you manually enter the span, consider factoring Calcon for simulated load tests.

1. Press **CAL**
2. Press ↓ until Span displays
3. Press **ENTER**

   The current span value displays
4. Press **ENTER** and the display flashes.
5. Press the arrow keys to enter the span constant
6. Press Enter to save your selection.
7. Press **RUN/SET-UP** to return the Integrator to Run mode.
8. Routine Calibration

3.4.3. Routine Calibration

Routine calibration consists of periodic zero and span calibration procedures. These procedures make fine adjustments to compensate for material build up, mechanical wear, and various conveyor characteristics.

Run the belt empty during routine calibrations. Always perform zero calibration before span calibration.

Since most installations differ in characteristics, Thermo recommends a record be kept of calibration results. This helps to determine the frequency of calibration checks necessary to maintain your accuracy requirements. (See 3.4.4 Keeping a Calibration Record.)

3.4.3.1 Routine Zero Calibration

To begin routine zero calibration (Refer to Section 3.4.1.1 Auto Zero)

1. Press the **CAL**

   ZERO CALIBRATION displays
2. Press **ENTER**

   Calibration begins. After approximately 6 minutes, **X.XX** displays.
3. Press **ENTER**

   ERR:X.XX% displays
4. Press **ENTER**

   ZERO XXXXXX displays

5. Press **ENTER**

   ACQUIRED displays

6. Press **RUN/SET-UP** to return the integrator to Run mode.

3.4.3.2 Routine Span Calibration Using Electronic Calibration

To begin routine span calibration, follow this procedure: (Refer to Section 3.4.2.1 Auto Span Calibration Using R-Cal Input)

1. Press **CAL** and ↓

   SPAN CALIBRATION displays

2. Press **ENTER**

   CAL CON RCAL displays

3. Press ↓

   READY TO START displays

4. Press **ENTER**

   Calibration begins. After approximately six minutes, **XX.XX** displays.

5. Press **ENTER**

   ERR:X.XX% displays

6. Press **ENTER**

   SPAN XXXXXX displays

7. Press **ENTER**

   Acquired displays

3.4.3.3 Routine Span Calibration Using Weight or Calibration Chains

To begin routine span calibration using weight or calibration chains, follow this procedure: (Refer to Section 3.4.2.2 Auto Span Calibration Using Test Weights or Chains).

1. Press **RUN/SETUP** and ↓ two times

   CAL DATA displays

2. Press **ENTER**

   CALIBRATION MODE displays

3. Press **ENTER** to select calibration method

   ELECTRONIC RES or **WGHT OR CHAINS** displays

Note: If **WGHT OR CHAINS** displays, skip to step 5.

---

4. If **ELECTRONIC RES** displays, press **ENTER**

   The display flashes, press ↓ to select **WGHT OR CHAINS**

5. Press **ENTER** to accept the setting
6. Press **RUN/SET-UP**
7. Press **CAL**

   SPAN CALIBRATION displays

8. Press **ENTER**

   CAL WGH OR CHAIN displays

9. Press **ENTER**

   The calibration constant, Calcon, for the static weight or calibration chain is displayed. (Refer to 2.10.4.1 Selecting the Calibration Method to determine the Calcon value.)

10. Press ↓

    READY TO START displays

    Apply static weights or position calibration chain on the belt. Start the conveyor.

11. Press **ENTER**

    Calibration begins. After approximately six minutes, XX.XX displays.

12. Press **ENTER**

    ERR: X.XX% displays

13. Press **ENTER**

    SPAN XXXXXX displays

    Record this number as the left span in your calibration report.

14. **PRESS ENTER**

    ACQUIRED displays

15. Stop the belt and remove weights or chain
16. Press **RUN/SET-UP** to return to Run mode.

3.4.4. Keeping a Calibration Record

To better maintain the accuracy of your scale, you should keep a record of calibration results. This will help you determine the frequency of routine calibration to meet your accuracy requirements. The following chart illustrates the information you should record.

Table 3-2: Zero Test Data Log

Zero Test Data Log				
Conveyor Number:				
Scale Capacity:				
Test Time (sec):				
Date	**Acc Tons**	**% Error**	**New Zero #**	**Comments**

Table 3-3: Span Test Data Log

Span Test Data Log					
Conveyor Number:					
Cal Weight (lbs)					
Chain (lbs/ft):					
Date	**Calcon**	**Acc Tons**	**% Error**	**New Span #**	**Comments**

3.5. Setting up Protection Levels

The Mini 110101F allows you to define protection levels and associate passwords with them to guard against unauthorized changes to operating parameters. At the **TEST** menu, you define a password. You have to activate the password at the **PROTECTION** menu.

The following procedures demonstrate how to define and enter a password.

1. Press **RUN/SET-UP**,

   PROTECTION displays

2. Press ↓ until **TEST** displays
3. Press **ENTER** until the screen flashes.
4. Use the arrow keys to enter a password. Record this password and store it in a safe place.

3.5.1. Activating a Password

The password is not active until you do the following:

1. Press **RUN/SET-UP**

   PROTECTION displays

2. Press **ENTER**

   NOT ACTIVE displays

3. Press **ENTER**

   You will be asked to enter the password you just selected in 3.5.1 Defining a Password.

4. Use the arrow keys to enter the password.
5. Press **ENTER** to save the password.
6. Select **ACTIVE** and press enter to save the selection.
7. Press **RUN/SET-UP** to return the integrator to Run mode

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Chapter 4
Maintenance and Troubleshooting

This chapter provides information about maintaining the Mini 11-101F Integrator. It includes instructions for keeping the belt scale system clean and checking areas of the system that may cause operational problems.

There are also procedures for testing system components and identifying and fixing certain Mini 11-101F errors.

The maintenance information in this chapter should be sufficient to meet your service needs. If you encounter a problem that requires technical assistance, please call your service representative (refer to Service and Repair Information in Chapter 5 for telephone numbers).

4.1. Overview

You can expect your Mini 11-101F Integrator to operate satisfactorily and hold its calibration for weeks with a minimum of maintenance. However, in a new installation, some calibration shifts may occur because of changes in measuring components or conveyor belt tracking. Check the system frequently at first to determine when calibration is required. Check the zero calibration every other day and the scale calibration every week for several months after installation.

Follow the recommendations in this chapter and in your scale documentation for checking calibration and maintaining the belt scale system. Your Mini 11-101F Integrator is capable of efficient and reliable operation when it is properly cleaned and maintained as recommended in this chapter.

4.2. Safety Precautions

WARNING

Failure to follow safe installation and servicing procedures could result in death or serious injury.

- Make sure only qualified personnel perform installation and maintenance procedures in accordance with the instrucitons in thismanual.
- Allow only qualified electricians to open and work in the electronics cabinets, power supply cabinest, control cabinets, or switch boxes.
- Covers over the electronics and rotating parts must always remian in place druing normal operation. Remove only for maintenance, with the machine's power OFF. Replace all covers befroe resuming operation.
- During maintenance, a safety tag (not supplied by the factory) is to be diplayed in the ON/OFF switch areas instructing others not to operate the unit.

WARNING

High voltage that may be present on leads could cause electrical shock.

- Use extememem cautio when testing in, on, or around the electronics, PC boards, or modules. There are voltages in excess of 115 V or 230 V in these areas.
- All switches (control, motor, power, as applicable) must be OFF when checking input aC lectrical connections, removing or inserting printed circuit boards, or attaching voltmeters to the system.

CAUTION

Keep hands and clothing away from all moving or rotating parts.

CAUTION

Do not place or store objects of any kind on the machine.

4.3. Routine Maintenance

The Mini 11-101F Integrator is a solid-state device and, as such, should require very little maintenance. This section offers suggestions for maintaining accurate operation of both the belt scale and the Mini 11-101F.

4.3.1. Cleaning Instructions

Keeping your system clean is the single most important factor in ensuring that it stays in good operating condition. The belt scale should be cleaned regularly to maintain the efficient operation of the system. Keep the scale clear of rocks, dust, and material build up. Material build up in certain areas of the equipment can affect weighing performance.

Be sure to follow the cleaning and routine maintenance instructions for your belt scale in addition to those presented in this section.

The Mini 11-101F front panel and enclosure can be wiped clean with a damp cloth and, if necessary, a mild detergent.

- All panels and doors covering the electronics must be in place and tight. Damage to the electronics could result from water, moisture, or contamination in the enclosure.
- Do not use abrasive cleaners, especially on the display window.
- Do not use any kind of scraper to remove debris from the front panel.

- Do not use solvents to clean the system because of the possibility of damage to electrical leads and plastic components.

4.3.2. Preventative Maintenance

There are a number of tasks you can perform to prevent problems that may affect belt scale performance and integrator accuracy.

- Keep the conveyor belt trained to run true to the centerline of the idlers in the area of the scale when the belt is running empty as well as under loaded conditions.
- Adjust belt loading to stay within instrument range.
- Keep the material profile as uniform as possible.
- Material may form a film on the belt that is never discharged, especially when handling wet, fine materials. Use a belt scraper to remove film.

  If you cannot remove the film, the zero calibration will need to be adjusted. Any change in the buildup of film adhering to the belt will require further zero adjustment.
- Keep the Mini 11-101F enclosure door tightly closed to prevent dirt infiltration.

4.3.3. Calibration Checks

The system should be checked frequently to determine when calibration is required. It is recommended that zero calibration be checked every other day and that scale calibration be checked every week for several months after installation. Observe the results and lengthen the period between calibration checks if your scale is holding its calibration well.

If the system does not operate correctly after initial set up and calibration, first try performing the procedures again (See Cold Start Procedure in Section 4.5.1. If the problem persists, follow the suggestions in this section.

4.3.3.1 Zero Calibration Shifts

When zero shift occurs, the span shifts by a like number of tons/hour. This then appears as a span shift. Common causes of zero shifts include:

- Material buildup on the scale or belt
- Idler alignment
- Conveyor belt tracking
- Non-uniform conveyor belt
- Conveyor belt stretch
- Problems with the load cell or the electronic measuring components
- Improper shielding or grounding of field wiring

4.3.3.2 Span Calibration Shifts

Span shifts do not affect zero. Common causes of span shifts include:

- Speed sensor roll buildup or slipping
- Idler alignment or spacing
- Changes in material density or profile
- Conveyor belt tracking
- Problems with the load cell or the electronic measuring components
- Improper shielding or grounding of field wiring

4.4. Troubleshooting and Maintenance Procedures

CAUTION

This instrument should not be operated at more than the production rate stated on your Equipment Specification sheet or used in applications other than those stated in the original order.

CAUTION

Before performing any drastic modifications to this instrument, refer to your warranty or contact your service representative.

If your Mini 11-101F is not operating correctly, there are several things you can do to determine the cause of the problem.

First, do a visual inspection—not only of the Mini 11-101F but also of the conveyor belt and the material load. If you find a problem that you cannot correct, contact your service representative.

If the problem is not apparent, a qualified service technician may be required to do troubleshooting procedures or replace parts.

Visual Inspection

If you are experiencing operational problems with the Mini 11-101F Integrator, a quick visual inspection may reveal the source of the problem. Check the following items before proceeding to more specific troubleshooting procedures.

1. Check power
   - Make sure power is ON at the mains.
   - Make sure there is incoming power to the Mini 11-101F.
   - Make sure the input power selection switches are set to the correct voltage. (See “Input Power Requirements” on page 2-2.)
   - Make sure the fuse is firmly seated.
2. Check connections
   - Make sure all field-wiring terminations are secure.
   - Make sure the display module and keyboard connectors are firmly seated in their connections.
   - Make sure the remote counter and input/output modules are secure in their sockets.
   - Make sure all jumpers are in the correct position.
3. Check the front panel.
   - Check system status LEDs.
   - Check and handle alarm messages.

4.5. Alarm Messages

The Mini 11-101F Integrator has built-in troubleshooting capabilities in the form of system alarms. A number of possible problems are automatically detected and a message is displayed on the Run Menu. The alarm LED on the front panel also flashes when an alarm condition is detected.

The errors detected by the Mini 11-101F are as follows:

- **LOW RATE** - low material flow rate.
- **HIGH RATE** - high material flow rate.
- **REM CNT OVRFL** - remote counter overflow
- **BLT PLS CNT OVF** - belt pulse counter overflow
- **COLD START** - installs default set-up and calibration constants.
- **LOAD CELL FAIL** - loss of the load cell signal.
- **MAX ZERO CORRECTION** - zero correction exceeds the range setting.
- **MATH ERROR** - incorrect set-up data is entered or hardware failure.

Alarms can be defined as two types in the Mini 11-101F, process alarms, and hardware alarms.

4.5.1. Process Alarms

A process alarm activates when the process variable exceeds the alarm set point.

The low rate and high rate alarms are *Process Alarms*. A set point is programmable for each. Output relays can be assigned for each. (See A.2.5 Alarm Definition Menu)

If the alarm condition has been cleared, the status of the relay returns to normal. Press **ENTER** to reset the lighted LED and message display.

To reset all of the alarms, press **ENTER** until the **NO ALARMS** message is displayed.

4.5.2. Hardware Alarms/Self Test Procedure

Hardware alarms can detect failures in the integrator, load cell, speed input, and numerical data. There are no programmable set points. When hardware alarms signal there are a variety of service diagnostic tests you can perform. These tests should be used as part of the troubleshooting procedures. The self-tests are found within the **TEST MENU**.

4.5.2.1 Displaying Raw A/D Data (A/D Gross)

The **A/D GROSS** display shows the analog/digital converter gross, which is the total weight on the load cells. To access this display do the following:

1. Press Run/Set-up and press the ↓ until **TEST** displays.
2. Press Enter and press the ↓ until **AD/ GROSS** displays.
3. Press ↓ to continue to the next menu item or **RUN/SET-UP** to put the integrator in Run mode.

4.5.2.2 Displaying Raw A/D Data (A/D Net)

A/D Net is the analog/digital converter gross after the zero constant has been subtracted. It indicates the weight on the load cell.

Press ↓, move to **A/D NET** and press **ENTER.**

4.5.2.3 Displaying Pulse per Minute (Pls/Min)

The pulse per minute displays the pulse per minute of the designated speed sensor. The values were set up in the I/O (Input/Output) menu at the **SPEED INPUT** selection.

Press ↓, move to **PLS/MIN** and press **ENTER**.

4.5.2.4 Displaying Belt Speed (SP)

This menu item displays the current speed of the belt and is displayed in distance/time.

Press ↓, move to **SP** and press **ENTER.**

4.5.2.5 Displaying Belt Loading (PS)

Belt loading displays the wt/distance of the load on the load cell.

Press ↓, move to **PS** and press **ENTER**.

4.5.2.6 Displaying Load Cell Output (LC SUP)

This menu item displays the mV output of the load cell with a load. The load cell output will change depending on the load.

Press ↓, move to **LC SUP** and press **ENTER**.

4.5.2.7 Displaying Correction Zero (C_Zero)

Correction Zero is used to trim the minimum value of the analog output. The value can be changed at this menu. Values manually entered are adjusted back to zero when a scale auto zero test is performed.

1. Move to **C_ZERO** and press **ENTER**, the current value displays.
2. Press the arrow keys to enter a changed value.
3. Press **ENTER** to save the changes.
4. Press ↓, move to the next menu item

4.5.2.8 Displaying Correction Span (C_Span)

Correction span sets the parameters or acceptable range for the analog output.

1. Move to **C_SPAN** and press **ENTER**, the current value displays.
2. Press the arrow keys to enter a changed value.
3. Press **ENTER** to save the changes.
4. Press ↓, move to the next menu item.

4.5.2.9 Displaying the Software Version (Softwar Ver)

The current software version in the Mini 11-101F is displayed for reference only on the **TEST** scroll.

Press ↓, move to **SOFTWAR VER** and press **ENTER**

4.5.2.10 Testing Memory

A self-diagnostics test that test the Random Access Memory (RAM) of the Mini 11-101F Integrator.

Press ↓, move to **MEMORY TEST** and press **ENTER**,

- **RAM OK** displays if there are no memory problems.
- **FAIL** displays if there is a problem with the mother board

4.5.2.11 Testing Input

This diagnostic procedure tests the digital inputs and indicates if the inputs you entered in the **I/O MENU** are open or closed (on or off). (See A.2.4 Input/Output (I/O Data) Menu.)

1. Move to **INPUT TEST** and press **ENTER.** The display shows all three inputs at one time. Example: INPUTS 010

   The first digit on the right of the display refers to input 3; the second digit from the right refers to input 2 and so on.

   If an input displays 0, it indicates the input is open (off). If it displays a 1, it indicates the input is closed (on).

2. Press ↓, move to the next menu item.

4.5.2.12 Testing Output

This diagnostic procedure tests the digital outputs and indicates if the outputs you entered in the I/O Menu are open or closed (on or off). (See A.2.4 Input/Output (I/O Data) Menu).

1. Move to **OUTPUT TEST** and press **ENTER**. The display shows all five outputs at one time.

   Example: OUTPUTS 10010

   The first digit on the right of the display refers to input 5; the second digit from the right refers to input 4, and so on.

   If an input displays 0, it indicates the input is open (off). If it displays a 1, it indicates the input is closed (on).

2. Press ↓, move to the next menu item.

4.5.2.13 Lamp Test

LAMP TEST tests the lamp in the LED display area.

Press ↓, move to **LAMP TEST** and press Enter. All LEDs and digits of the display should blink for a number of seconds.

4.5.2.14 Entering a Forced Value

FORCE VALUE allows you to enter a forced value of wt/time for testing or calibrating remote equipment.

1. Press ↓, move to **FORCE VALUE** and press **ENTER**.
2. Press the arrow keys to enter the desired value, press enter to save your entry.

4.5.3. Load Cell Excitation and Signal Voltage

Follow the procedure below to test for load cell failure.

1. Measure excitation voltage across terminal 21 negative and 20 positive in the scale junction box.

   This should be 10 VDC ±5%.

2. If the excitation voltage is incorrect, measure the excitation voltage in the Mini 11-101F Integrator across terminal M3–17 negative and M3–12 positive.

   This should be 10 VDC ±5%.

3. Measure the DC mV signal voltage across terminal 22 positive and 23 negative in the scale junction box. This should be within 0-20 mV DC (2 mV/V load cell), 0–30 mV DC (3 mV/V load cell), or 0–18 mV DC (1.8mV/V load cell).

4. Measure DC mV signal voltage across terminal M3–14 positive and M2–15 negative in the Mini 11-101F Integrator.

   This should be the same as the previous Step 3.

The mV output is in direct relation to weight applied. As weight is increased, output should increase.

4.5.4. Cold Start Procedures

It may be necessary to cold start the Mini 11-101F if the software becomes corrupted or if there has been an extended loss of power. Field entry data will be replaced with factory default constants.

Follow this procedure to force a cold start. Make sure you record all configuration, setup, and calibration data before beginning this procedure so you can re-enter it.

1. Turn power off at the main box.
2. Open the front panel.
3. Locate jumper SW4 in the upper center section of the motherboard (Figure 2-4).
4. Remove the jumper SW4 and turn the power on. The memory is now erased.
5. Wait until the cold start message appears in the LED display.
6. Replace the jumper.

The following is a list of factory default settings that are installed on the Mini 11-101F after performing a cold start.

Table 4-1: Scale Data Menu Default Settings

Menu Item	Default Setting
Scale Data Menu	
Scale Units	Tons
Decimal Place	1
Scale Capacity	200.0
Lcell Cap	250.0
Cells Number	1
Filter Damping	2 seconds
Low Rate	105%
High Rate	105%
Rate Alarm Delay	5 seconds
AZT Range	Disabled
Limit AZT	2.0%
Dead Band	0.0%

Table 4-2: Calibration Menu Default Settings

Menu Item	Default Setting
Calibration Menu	
Calibration Mode	Electronic Res (R-Cal)
R-Cal Mode	Automatic Calcon
Cell mV/V	1.800 mV/V
Cell Resistance	350.000 ohms
Calibration Resistance	165,000 ohms
Lever Ratio	1.000
Idler Spacing	3.00 ft
Idlers Number	1
Conveyor Angle	0.0 degrees
Calcon R-Cal	0

Table 4-3: I/O Data Menu Default Settings

Menu Item	Default Setting
I/O Data Menu	
Range MA	4-20 MA
Damping	2 sec
Divide Out	100
Pulse Width	0.100 S
Input 1	Pulse
Language	English
Input 2	Clear Total
Input 3	Clear Total
Input 4	Not Used
Output 1	Instrument Ready
Output 2	Alarm
Output 3	Totalizer
Output 4	High Rate
Output 5	Not Used
Alt Rate-Tot	0 sec
Date Format	MM-DD-YY

Table 4-4: Alarm Menu Default Settings

Menu Item	Default Setting
Alarm Menu	
Low Rate	Not Used
High Rate	Not Used
REM CNT OVRFL	Alarm
Belt PLS CNT	Alarm
Cold Start	Alarm
Load Cell Fail	Not Used
Max Zero Correction	Alarm
Math Error	Alarm

Table 4-5: Printer Scroll Menu Default Settings

Menu Item	Default Setting
Printer Menu	
Baud Rate	9600
Stop Bits	1
Parity	Even
Word Length	8
Handshake	Not Used
End of Line	CR+LF
Print Interval	0
Report Format	DATE nn-nn-nn TIME nn:nn:nn RATE nnn.n TPH Master Total nnnnnn.n Ton Reset Total n
String #1	No
Contents String #1	XXXXXXXXXXXXXXXX
String #1 Position	0101
String #2	No
Contents String #2	XXXXXXXXXXXXXXXX
String #2 Position	0102
String #3	No
Contents String #3	XXXXXXXXXXXXXXXX
String #3 Position	0103
Rate Position	0104
Mtotal Pos	0105
Rtotal Pos	0106
Date Position	0107
Time Position	0108

4.5.5. Removing a Forgotten Password

If you have forgotten the password entered into the integrator, follow this procedure to remove the password.

1. Press **RUN/SET-UP**

   PROTECTION displays

2. Press **ENTER** three times.

   The left most zero begins flashing.

3. Use the arrow keys to enter the password, 07832500.

4. Press **ENTER** to save the selection.

   This sets the password to the factory service level (Refer to Setting Up Protection Level in Section 3.5 for setting a new password).

   RUN/SET-UP PROTECTION displays

5. Press ↓ until **TEST** displays

6. Press **ENTER**, the old password displays. Use the arrow keys to enter a new password or 20,000,000 (default).

7. Press **RUN/SETUP**

   PROTECTION displays

8. Press **ENTER** 3 times

   The left most digit begins to flash

9. Use the arrow keys to enter the previously installed password (see Step 3) or the default password (20,000,000).

10. Press **ENTER**, **ACTIVE** displays

11. To change the password to In-Active re-enter the password under the Protection display (refer to Section 3.5.2 Activating a Password).

4.5.6. Resetting the Master Total

The master total would be reset to zero if the Mini 11-101F Integrator were used on a portable application where the conveyor is moved. Each new location would require the master total to be reset.

Follow this procedure to reset the master total.

1. Press **RUN/SET-UP**

   PROTECTION displays

2. Press **ENTER** three times

   The left most zero begins flashing

3. Use the arrow keys to enter the number 07832500, press Enter.

4. Press **RUN/SET-UP**
5. Press **RATE/TOTAL**

   MT (master total) displays.
6. Press **ENTER**

   CLEAR TOTAL displays
7. Press **ENTER** to reset the master total to zero.

You must clear the factory set protection level after resetting the master total. Use the following procedure to clear the protection level.

1. Press **RUN/SET-UP** and **PROTECTION** displays
2. **PRESS ENTER** three times

   The left most zero begins flashing.
3. Enter the previously installed password or, if there has been no password previously installed, enter in the default password 20000000.
4. Press **ENTER,** setting the password to **NON ACTIVE**.
5. Press **RUN/SET-UP** to return the integrator to Run mode.

4.5.7. Replacing the Lithium Battery

WARNING
Danger of explosion if battery is incorrectly replaced.

If you have selected the printer option for the Mini 11-101F, the COMM board is powered by a lithium battery. The battery can be removed and replaced without any special tools. Replace the battery only with the same or equivalent type recommended by Thermo. Dispose of the used battery according to manufacturer's instructions on the battery and your local Hazardous Waste Policy.

You my also return the used battery to Thermo, freight prepaid, for disposal. Contact our Repair and Returns department to get a Return Material Authorization number before shipping any product for disposal (refer to 5.1 Service and Repair Information).

4.6. Jumper and Switch Configuration on Circuit Boards

The following table lists all jumpers and switches located on the Mini Integrator circuit boards. Jumpers and switches normally need not be changed. They are listed here in the event one is mistakenly moved.

The word Open in the table indicates there is no jumper, the word Close means a jumper is in place. The shaded boxes indicate the default setting of the jumpers.

Table 4-6: At a Glance Mother board Jumper/Switch Configuration

Motherboard			
Function	**Pot/Jumper**	**Status**	**Description**
Coarse Zero	P2		Coarse zero trimmer
	J1	OPEN	Default – disable coarse zero trimmer
		CLOSE	Enable coarse zero trimmer (not used)
IC4 Converter	J2	OPEN	Default – Factory configured, do not change
Load Cell Sensing	S1, S2	OPEN	External sensing
		CLOSE	Default – Internal Sensing
Reset Circuit	J6	CLOSE	Default – Factory configured, do not change
	J7	OPEN	Default – Factory configured, do not change
Model Selection	J10A	OPEN	10-101P 11-101F
	J10B	CLOSE	
Serial Port	S4	CLOSE	Factory configured, do not change
Display Contrast	P1		Display contrast control
Display Light	P4		Display light control
Speed Input	J12A	CLOSE	Default – direct speed input
	J12B	OPEN	
	J12A	OPEN	Inverted speed input
	J12B	CLOSE	
Filter Cut Out Frequency	J13A	OPEN	Frequency greater than 30 Hz
	J13B	CLOSE	
	J13A	CLOSE	Default – Frequency less than 29 Hz
	J13B	OPEN	
Line Frequency	SW1	OPEN	Default – 60 Hz
		CLOSE	50 Hz
Force Cold Start	SW4	CLOSE	Default – retain data at power up
		OPEN	Force Cold Start at power up
Display Selection	S8	OPEN	Select display AMEL mod 013231160803135

Motherboard			
Function	**Pot/Jumper**	**Status**	**Description**
		CLOSE	Select old type display
Digital Output KF (Out 4)	J8	OPEN	Output is software controlled
	J9	CLOSE	
	J8	CLOSE	Output is hardware controlled (watch dog function)
	J9	OPEN	
Converter IC37	J14	OPEN	Factory configured, do not change
	J15	OPEN	Factory configured, do not change
Analog Output	J16A	OPEN	0-10 VDC
	J16B	CLOSE	
	J16A	CLOSE	0-20 mA or 4-20 mA
	J16B	OPEN	
P3			Analog Output Span Adjust
P5			Analog Output Zero Adjust

Table 4-7: At a Glance Optional COMM Board Jumper/Switch Configuration

Optional COMM Board			
Function	**Pot/Jumper**	**Status**	**Description**
Serial Port	J1	A / CLOSE	RS-422
		B / OPEN	RS-232
Termination	J2	A / CLOSE	Terminated
		B / OPEN	Not terminated
Battery	J3	A / CLOSE	Battery Connected
		B / OPEN	Disconnect Battery

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Chapter 5
Service Repair and Replacement Parts

This chapter provides information about service, repair, and replacement parts for your *Thermo* product. It includes the telephone numbers for various departments at *Thermo*, the procedure for ordering replacement parts, a *Return Material Authorization Form*, and the parts list for the product are also included in this chapter.

The maintenance information in this manual is designed to meet your service needs. If you should encounter a problem that requires technical assistance, you may call *Thermo Product Service* at (800) 227-8891.

Thermo also provides on-site service technicians to assist customers with installation, setup, initial calibration, customer training, maintenance, and repair. Contact the *Thermo Field Service* department at the number given below for current rates and scheduling.

Thermo has repair centers located at the plant in Minneapolis, Minnesota. Products that need system checkout or repair can be returned to the plant with the *Return Material Authorization (RMA) Form*. Contact our Repair and Return department (800) 227-8891 to get an *RMA* number to use on the form.

Note: Have your machine model number and serial number available when you call.

Main Switchboard	(800) 227-8891
FAX	(763) 783-2525
Service	(800) 227-8891
Return Material Authorization & Repair	(800) 227-8891

5.1. Parts Ordering Information

For the fastest service when ordering parts, telephone or FAX the *Thermo Parts Department* at the numbers given below. Your regional field service representative can also assist you with parts orders.

The recommended procedure for ordering parts is:

1. Determine the broken or faulty part.
2. Locate the part in the Parts List.
3. Find the part number(s) for the item(s) you need.
4. Before you contact *Thermo* for your parts, make sure you have the following information:
   - Machine model and serial number
   - Purchase Order number
   - Date Required
   - Preferred shipping method
   - Part number(s), description, and quantity needed.
   - Telephone or FAX:

   Thermo Electron Corporation
   Customer Service Department
   501 90th Ave. NW
   Minneapolis, MN 55433

   FAX: (763) 783-2525
   Phone: (800) 227-8891
   Return Material Authorization and Repair: (800) 227-8891

Thermo
ELECTRON CORPORATION

501 90th Avenue N.W.
Minneapolis MN 800-227-8891

Return Material Authorization
RMA -

(This RMA Number Must Be Marked On All Paperwork And On Outside Of Package)

Req'd. By: _____
Date: _____
Customer Contact: _____
Phone: ( ) _____
Area Code

Return, Freight Prepaid To:
Thermo Electron Corporation
501 90th Avenue N.W.
Minneapolis, MN 55433

Bill To Customer #: _____ Ship To _____

Returned From: Return To:

_____ _____
_____ _____
_____ _____

Description Of Material Being Returned:

_____
_____
_____

Describe Equipment Malfunction Or Defect, If Any; Symptoms:

_____
_____

Minimum Charge
☐ Informed Customer of ☐ Inspection Charge Per Item

Service Requested:

☐ Repair & Return
☐ Estimate Required
P.O. No.: _____

☐ Return for Credit
☐ Original P.O. or Thermo Order No.: _____

☐ Warranty Repair or Replacement
Serial No: _____

☐ Return Warranty/Exchange Unit
Shipped on Thermo Order No.: _____

☐ Other: _____

Disposition/Comments: (Thermo Electron Internal Use Only)

_____
_____

5.2. Replacement Parts

EQUIPMENT	PART NUMBER
PCBA Motherboard 051308	
PCBA, A/C (Relay) Output board	
PCBA, Serial Printer Interface Board	
A/C Assembly with Transformer and Relay Output Board	
A/C Transformer	
Keyboard Assembly	
Display Assembly	
Fuse, 110 VAC, 1.0 Amp, 5 x 20 mm	
Fuse, 220 VAC, 0.5 Amp, 5 x 20 mm	
Door key	
Shock Mounts	

5.3. Disposal of Hazardous Waste

Disposal of lithium batteries and soldered printed circuit boards must be in accordance with your local *Hazardous Waste Policy*.

As an alternative product supplied by *Thermo* may be returned freight pre-paid, for disposal. Contact the Repair Department for a *Return Material Authorization Number* before shipping any product for disposal.

Appendix A
Mini 11-101F Menus

This appendix describes all of the menu displays, menu scrolls, and minimum/maximum/default values for the Mini 11-101F Integrator.

The Mini 11-101F is a menu-driven machine that allows you to access all setup, test, and calibration parameters. You select and display menu scrolls by pressing the function keys on the front panel, then using the up and down Scroll keys on the front panel. Optional menu scrolls and selections are available only if the option has been installed.

Scroll keys are used to select choices and enter data on the menu scrolls. If you enter a value for a parameter that is outside of the valid range, the system displays a warning message so you can re-enter the data.

To accept the default value displayed on any menu, press the down Scroll key to scroll to the next screen.

If the integrator is password protected, you must enter the appropriate password before you will be allowed to make changes or perform routine calibrations. Menus may be viewed without entering the password, but no entries are allowed.

If you make an error while entering data and need to start over press the Run/Set-Up key. Also, press the Run/Set-up key to put the Mini 11-101F in Run mode.

The Mini 11-101F Integrator menus are shown on the following pages.

A.1. Run Menu

This section describes the Mini 11-101F Run Menu and the information that can be displayed on it. It also provides procedures for operations initiated from the Run Menu

The **RUN/SET-UP** menu is the normal mode of operation. At any time, pressing **RUN/SET-UP** returns the integrator to the Run mode, even if some other function is in progress.

The selectable displayed information in the **RUN** menu is:

- **PROTECTION** - Protection allows you to set the password function to **ACTIVE** or **NOT ACTIVE**. It can be accessed while the integrator is in Run mode by pressing the **RUN/SET-UP KEY** once.
- **FLOW RATE** - The rate at which bulk material is being conveyed and delivered. This information displays while the integrator is in Run mode.
- **MASTER TOTAL** - The aggregate of tons totalized by the integrator since installation. This number cannot be cleared. It can be accessed by pressing the **RATE TOTAL** key while the integrator is in Run mode.

- **RESET TOTAL** - Displays a totalized quantity. It can be accessed by pressing the **RATE TOTAL** key two times while the integrator is in Run mode.

  If **ENTER** is pressed while the **RESET TOTAL** is on display, the next display states **CLEAR TOTAL?.** Pressing **ENTER** again clears the **RESET TOTAL**.

- **PRINT TOTAL** - If the optional COMM board is installed a report is printed on demand. It can be accessed by pressing the **RATE TOTAL** key three times while the integrator is in Run mode and pressing **ENTER**.

  The format on the report depends on set up. The default format is as follows:

DATE	09-19-00
TIME	02:40:35
RATE	133.5 TPH
MASTER TOTAL	239961.2 Ton
RESET TOTAL	0

  An optional customer defined report is available. It includes the above data plus three alphanumerical strings printed in a position the user can define by entering row and column numbers for each item to be printed (See A.2.6 Printer Scroll (Optional) Menu).

- **ALARMS** - Scrolling to this menu item tells you the alarms that are currently exist. When you select **ALARMS** and press enter, if **NO ALARMS** displays this indicates there are no active alarms.

  If one or more alarms exist, an alarm message is displayed for each. The following table shows how you can obtain the desired display

A.2. Set-up Menu

Set-up menus can also be accessed by pressing the **RUN/SET-UP** key. After pressing **RUN/SET-UP**, press ↓ on the front panel to access the menu items.

Appendix Table A-1: Set-Up Menu Displays

Key Pressed	Display
RUN/SET-UP	**PROTECTION**
DOWN ARROW	**SCALE DATA**
DOWN ARROW	**CAL DATA**
DOWN ARROW	**I/O DATA**
DOWN ARROW	**ALARMS**
DOWN ARROW	**TEST**

A.2.1. Protection Menu

The Protection Menu allows you to activate a password that has been entered at the Test Menu. (See Setting Up Passwords in Section 3.5) Follow this procedure to activate your password.

The following procedures demonstrate how to define and enter a password.

1. Press **RUN/SET-UP**,

   PROTECTION displays

2. Press ↓

   TEST displays

3. Press **ENTER** until the screen flashes.
4. Use the arrow keys to enter a password. Record this password and store it in a safe place.

A.2.2. Scale Data Menu

The Scale Data Menu provides access to the screens you use for set-up and calibration. In addition, there are other menu items that can be added to the integrator to enhance usability.

The following three steps are common to the scale data set-up sequence. If you choose to use any default settings and there are no changes to be made to a specific menu item, press to scroll past the menu item.

1. Press **RUN/SET–UP**

   SCALE DATA displays

2. Press **ENTER**

   SCALE UNITS displays

3. Press ↓ to go to the next menu item

A.2.2.1 Setting the Scale Units

When you select a scale unit, you also select the units used for the rate display. Default scale units are Tons. All units are measured at a rate of units/hour. Scroll to Scale Units and select the appropriate data.

Available selections for SCALE UNITS and the way they are displayed are listed below. Select the units you are using for your particular scale.

Appendix Table A-2: Scale Units

Units	Display	Weight	Length	Rate
Pounds	Lb	Lb	ft	Lb/h
Tons	TON	Lb	ft	TPH
Long Tons	LTN	Lb	ft	LTph
tons	t	kg	m	t/h
kg	kg	kg	m	kg/h

Note: If the LED display continues to flash, press ENTER until the flashing stops. Selections are not saved until the LED stops flashing.

A.2.2.2 Decimal Place

The **DECIMAL PLACE** menu lets you choose the number of decimal places to be displayed. Select the number of decimals.

Min: 0
Max: 3 (.000)
Default: 1 (.0)

Note: During zero and span calibration, the resolution of the displayed total is 10 times greater than it normally would be.

A.2.2.3 Scale Capacity

The **SCALE CAPACITY** menu allows changes in scale capacity. Enter the capacity of your scale.

Min: 1.0
Max: 100,000.0
Default: 200.0

A.2.2.4 Setting the Load Cell Capacity (LCELL CAP)

Enter the load cell capacity on the LCELL CAP menu. Enter the capacity of only one load cell. All load cells will be the same size.

The capacity of one load cell is 100kg = 220.5 and 220kg = 441.

Min: 10.00
Max: 15000.00
Default: 250.00

Note: If the unit measure of the load cell is tons (Tons) or pounds (Lb), then the display cell size is pounds (Lb). If the unit of measure is tons (t/metric ton) or kilograms (kg) the display cell size is kilograms (kg). (Convert as necessary 1 kg = 2.2 lb)

A.2.2.5 Setting the Number of Load Cells (Cells Number)

The Cells number menu allows you to enter the total number of load cells being used.

Min: 1
Max: 4
Default: 1

A.2.2.6 Setting the Filter Damping

When process variables are displayed on the screen, they can be damped by a programmable factor to filter out variations that can be introduced by mechanical vibrations.

The Filter Damping menu allows changing the rate filter damping of the display. It does not dampen the rate output.

Min: 0 Sec
Max: 30 Sec
Default: 2 Sec

A.2.2.7 Setting the Low Rate Set

The Low Rate menu function sets the minimum rate value and when it is reached will trigger an alarm.

Min: 0%
Max: 100%
Default: 0%

A.2.2.8 Setting the High Rate Set

The High Rate menu function sets the maximum rate value and when it is reached will trigger an alarm on the Mini 11-101F.

Min: 0%
Max: 150%
Default: 150%

A.2.2.9 Setting the Rate Alarm Delay

The Rate Alarm Delay menu allows you to enter the number of seconds before the alarm sounds when the alarm is triggered.

Min: 0 sec.
Max: 60 sec.
Default: 5 sec.

A.2.2.10 Setting the Auto Zero Track Range (AZT Range)

Auto Zero Tracking, when enabled, allows continuous unassisted auto zeroing if the flow rate is less than an amount in percent of scale capacity (AZT Range in scale data). The flow rate must remain below AZT range for at least 2 test durations for a successful Auto Zero Track cycle to be completed.

Auto Zero Tracking is enabled by entering a value other than zero. When enabled, a 'Z' will appear in the left hand side of the flow rate display. When the 'Z' is steady, it indicates that the actual AZT cycle has started. The 'Z' continues flashing until the cycle is complete and zero is automatically changed if necessary. This procedure repeats itself as long as the belt is running and the flow rate remains below AZT range.

Min: 0%
Max: 20.0%
Default: 0% (disabled)

A.2.2.11 Setting the Auto Zero Tracking Limit (Limit AZT)

The Limit AZT menu defines the maximum amount of zero error (with reference to the scale capacity) that AZT can automatically compensate.

Min: 0.0%
Max: 20.0%
Default: 2.0%

A.2.2.12 Setting the Dead Band

The Dead Band is a percentage of the scale capacity (rate) in which the rate is ignored and a zero rate is forced. Totalization is frozen when the rate is below the dead band setting.

Min: 0.0%
Max: 5.0%
Default: 0.0% Calibration Data Menu

A.2.3. Calibration Menu

Calibration data defines the parameters to be used for calibrating the Mini 11-101F Integrator. Access these scrolls by pressing the Cal key on the front panel when the integrator is in Run mode.

A.2.3.1 Calibration Mode

The calibration mode menu item allows you to select the method you are using to calibrate your scale.

Selections: Electronic Res (R-Cal), Weights or Chains
Default: Electronic Res (R-Cal)

A.2.3.2 R-CAL Mode

The Mini 11-101F Integrator automatically calculates and installs the Electronic Res (R-Cal) calibration constant if automatic Calcon is selected.

The R-Cal mode must be entered and the belt test length entered in the CAL scroll to enable automatic calculations of the R-Cal calibration constant.

Selections: Manual Calcon, Automatic Calcon
Default: Automatic Calcon

A.2.3.3 Cell mV/V - Load Cell Sensitivity

From the Cell mV/V menu item, enter the load cell sensitivity in. The standard sensitivity of cells used in Thermo scale systems is:

- 10-101R Scale = 2.0 mV/v
- 10-30 Scale = 1.8 mV/v
- 10-20 Scale = 3.0 mV/v

Min: 1.000 mV/V
Max: 3.500 mV/V
Default: 1.800 mV/V

A.2.3.4 Cell Resistance

The Cell Resistance menu item allows you to enter the resistance of the load cell(s). The resistance for the load cell has been recorded on the System Data Sheet in the front of your belt scale manual. It is also stamped on the load cell cable.

Min: 50.000 ohms
Max: 1000.000 ohms
Default: 350.000 ohms

A.2.3.5 Calibration Resistance

The Calibration Resistance menu item allows you to enter the resistance of the resistor installed in your Mini 11-101F Integrator. (See the system data sheet for exact resistance.)

Min: 50,000 ohms
Max: 1,000,000 ohms
Default: 165,000 ohms

A.2.3.6 Lever Ratio

The lever ratio is the ratio between the weigh idler and the load cell. See the scale manual for exact dimensions:

Weighbridge	Ratio
10-101R - All widths	1.0
10-20-1 - 18” to 36” width	1.333
10-20-1 - 42” to 72” width	1.407
10-30 - All widths	1.

Min: 0.001
Max: 2.000
Default: 1.000

A.2.3.7 Idler Spacing

The Idler Spacing menu item allows you to enter the scale area idler spacing in feet or meters. Fractions cannot be entered. All measurements must be in decimal. Example: 42 ½ inch spacing = 3.542 feet.

Min: 0.001 ft
Max: 999.999 ft
Default: 3.000 ft

A.2.3.8 Idlers Number

The Idlers Number menu item allows you to enter the number of weigh idlers.

Min: 1
Max: 6
Default: 1

A.2.3.9 Conveyor Angle

The Conveyor Angle menu item allows you to enter the belt conveyor’s angle of incline.

Min: -25.0 degrees
Max: +25.0 degrees
Default: 0.0 degrees

A.2.3.10 Calibration Constant R-Cal

The Calcon R-Cal menu item allows you to factor or change the constant after automatic calculation.

Min: 1
Max: 999.999
Default: 0

A.2.4. Input/Output (I/O Data) Menu

The I/O section of the Mini 11-101F is fully configurable. All inputs and outputs are conventionally numbered and can be assigned to physical input and output terminals to accommodate your specific needs.

Listed below are the items contained on the Input/Output menu. The procedure for completing the alarm definition scrolls is basically the same for each alarm. Access these scrolls by pressing **RUN/SET-UP** and ↓ until I/O data is displayed then press the **ENTER** key to access the I/O menu items and scroll through the menu items.

A.2.4.1 Defining Range mA - Output Range

The Range mA analog output represents 0-100% of the scale capacity. Choose the selection that represents your remote device output.

Selections: 4-20 mA
20-0 mA
20-4 mA
0-20 mA
Default: 4-20 mA

A.2.4.2 Defining Current Damping

The damping menu item allows you to enter a time for the output to stabilize following a step change. This damping affects only the current output, not the displayed variable, which has a separate damping factor.

Min: 0 Sec
Max: 30 Sec
Default: 2 Sec

A.2.4.3 Defining Divide Out - Divisor for the Remote Counter

Divide out enables the pulse output for remote totalization to be factored to the master total in increments of 1, 10, or 100.

Example: Master total =100.0
Divide Out = 10
Each 10 counts = 1 pulse output
Selections: 1,10,100
Max: 100

A.2.4.4 Defining Pulse Width

The Pulse Width menu item allows you to enter the minimum on time or pulse duration in seconds for the remote output relay. The entry should be rounded to steps of 1 mS.

Min: 0.010 S
Max: 0.300 S
Default: 0.100 S

A.2.4.5 Defining Speed Input (Input 1)

The Input 1 menu item monitors the belt speed and can be either Pulse or Simulated. Pulse is generated by a sensor on the conveyor belt; Simulated is generated by the frequency of your power input.

Selections: Pulse, Simulate
Default: Pulse

A.2.4.6 Defining Language

The Language menu item allows you to select the language for display.

Selections: English or Spanish
Default: English

A.2.4.7 Defining Input 2

The **INPUT 2**-menu item allows you to select the function of digital input 2.

Selections: **NOT USED**
CLEAR TOTAL
BELT RUNNING
CLEAR ALARMS
AUTO ZERO
PRINT
CAL SWITCH
Default: **CLEAR TOTAL**

A.2.4.8 Defining Input 3

The **INPUT 3**-menu item allows you to select the function of digital input 3.

Selections: **NOT USED**
CLEAR TOTAL
BELT RUNNING
CLEAR ALARMS
AUTO ZERO
PRINT (OPTIONAL)
Default: **CLEAR ALARMS**

A.2.4.9 Defining Input 4

The Input4 menu item allows you to select the function of digital input 4.

Selections: **NOT USED**
CLEAR TOTAL
BELT RUNNING
CLEAR ALARMS
AUTO ZERO
PRINT (OPTIONAL)
Default: **NOT USED**

A.2.4.10 Defining Output 1

The Output 1 menu item allows you to select the function of digital output 1.

Selections: NOT USED
ALARM
INSTRUMENT READY
LOW RATE
HIGH RATE
TOTALIZER
FAIL

Default: INSTRUMENT READY

A.2.4.11 Defining Output 2

The Output 2 menu item allows you to select the function of digital output 2.

Selections: NOT USED
ALARM
INSTRUMENT READY
LOW RATE
HIGH RATE
TOTALIZER
FAIL

Default: ALARM

A.2.4.12 Defining Output 3

The Output 3 menu item allows you to select the function of digital output 3.

Selections: NOT USED
ALARM
INSTRUMENT READY
LOW RATE
HIGH RATE
TOTALIZER
FAIL

Default: TOTALIZER

A.2.4.13 Defining Output 4

The Output 4 menu item allows you to select the function of digital output 4.

Selections: NOT USED
ALARM
INSTRUMENT READY
LOW RATE
HIGH RATE
TOTALIZER
FAIL

Default: HIGH RATE

A.2.4.14 Defining Output 5

The Output 5 menu item allows you to select the function of digital output 5.

Selections: NOT USED
ALARM
INSTRUMENT READY
LOW RATE
HIGH RATE
TOTALIZER
FAIL
Default: NOT USED

A.2.4.15 Defining Alternate Rate Total - Alt. Rate-Tot

The Alt. Rate-Tot menu item displays alternates between total and rate. Entering 0 seconds disables this function.

Min: 0 Sec
Max: 20 Sec
Default: 0 Sec

A.2.4.16 Defining Data Format

The Data Format menu item elects the calendar format when the optional COMM board is installed.

Selection: MM-DD-YY
DD-MM-YY
Default: MM-DD-YY

A.2.5. Alarm Definition Menu

Mini 11-101F alarms are programmable. The alarm scrolls allow you to determine whether your Mini 11-101F will use the alarms. Access these scrolls by pressing Run/Set-Up, moving to the display Alarms, and pressing Enter.

To set the parameters for the alarms see A.2.2 Scale Data Menu.

When an alarm goes off, the Alarm LED flashes and the type of alarm displays and flashes on the screen. Each alarm can be reset if the alarm condition has been cleared using the **ENTER** key when the given alarm message is on the screen. To reset all of the alarms, press enter until the NO ALARMS message is displayed.

The procedure for completing the alarm definition scrolls is basically the same for each alarm. Access the Alarm menu by pressing Run/Set-Up, scroll until Alarm is displayed, and press Enter.

The Alarms menu contains these items:

- **LOW RATE** - Low material flow rate
- **HIGH RATE** - High material flow rate
- **REM CNT OVRFL** - Remote Counter Overflow - remote totalizer
- **BELT PLS CNT OVF** - Belt Pulse Count Overflow -
- **COLD START** - Installs the default constants
- **LOAD CELL FAIL** - loss of load cell signal
- **MAX ZERO CORR** - Zero correction exceeds the range setting
- **MATH ERROR** - Incorrect set-up data is entered or a hardware fail

A.2.5.1 Low Rate

The Low Rate menu item selects the function of the low rate alarm.

Selections: **NOT USED**
ALARM
FAIL
Default: **NOT USED**

A.2.5.2 High Rate

The High Rate menu selects the function of the high rate alarm.

Selections: **NOT USED**
ALARM
FAIL
Default: **NOT USED**

A.2.5.3 Remote Counter Overflow (REM CNT OVRFL)

The REM CNT OVRFL menu item selects the function of the remote counter alarm overflow.

Selections: **NOT USED**
ALARM
FAIL
Default: **ALARM**

A.2.5.4 Belt Pulse Counter Overflow (BELT PLS CNT OVF)

The **BELT PLS CNT OVF** menu item selects the function of the belt pulse count alarm overflow.

Selections: **NOT USED**
ALARM
FAIL
Default: **ALARM**

A.2.5.5 Cold Start

The Cold Start menu item selects the function of the cold start alarm.

Selections: NOT USED
ALARM
FAIL
Default: ALARM

A.2.5.6 Load Cell Fail

The Load Cell Fail menu item selects the function of the load cell fail alarm.

Selections: NOT USED
ALARM
FAIL
Default: NOT USED

A.2.5.7 Max Zero Correction

The Max Zero Correction menu item selects the function of the alarm max zero correction.

Selections: NOT USED
ALARM
FAIL
Default: ALARM

A.2.5.8 Math Error

The math Error menu item selects the function of the math error alarm.

Selections: NOT USED
ALARM
FAIL
Default: ALARM

A.2.6. Printer Scroll (Optional) Menu

The Printer Scroll Menu provides access to the items used for configuring a serial communication board (COMM A) and for setting up serial printer output. These boards are optional with the Mini 11-101F Integrator.

The printer scrolls define the communication parameters for serial channels. All of the steps for each item in this procedure are the same and listed below.

A.2.6.1 Baud Rate

The baud rate menu item allows you to specify the baud rate for the serial channel. This specifies the speed at which the data is transmitted.

Selections: 1200
2400
4800
9600
19200
38400
Default: 9600

A.2.6.2 Stop Bits

The Stop Bits menu item allows you to specify the number of stop bits used on the serial channel.

Selections: 1 and 2
Default: 1

A.2.6.3 Parity

The parity menu item allows you to specify the parity used on the serial channel.

Selections: ODD
EVEN
NOT USED
Default: EVEN

A.2.6.4 Word Length

The Word Length menu item allows you to specify the number of data bits (word length) used on the serial channel.

Selections: 7 and 8
Default: 8

A.2.6.5 Handshake

Specify the handshaking with the remote serial device.

Selections: not used
cts
xon-xoff
Default: Not used

A.2.6.6 End of Line

The end of line menu item allows you to select the combination of characters at end of line of the serial printer. Select the pattern you need for your device.

Selections: CR, LF, CR+LF
Default: CR+LF

A.2.6.7 Delay End of Line

Some printers cannot accept characters while they are printing, so the handshake is not controlled well. A delay at end-of-line can help.

Selections: 0–5 seconds
Default: 0 seconds

A.2.6.8 Print Interval

The print interval menu item allows you to specify the interval of time between automatic printouts of the totals. When 0 is entered, automatic printing is not performed.

Selections: 0–127 minutes
Default: 0

A.2.6.9 Report Format

There are two ways of defining the print format for your totals reports: use the predefined default format or define your own format using the printer setup procedures described in this section.

Selections: DEFAULT, USER DEFINED

Default: DEFAULT

The default format is as follows:

DATE	09-19-00
TIME	02:40:35
RATE	133.5 TPH
MASTER TOTAL	239961.2 Ton
RESET TOTAL	0

If the **USER DEFINED** report is selected, the following menus will be displayed and must be defined.

A.2.6.10 String #1

String #1 defines if the first optional alphanumeric string has to be included into the print report.

Selections: YES, NO
Default: NO

A.2.6.10.1 Contents String #1

CONTENTS STRING #1 defines the first optional alphanumeric string.

Selections: Any String
Default: XXXXXXXXXXXXXXX

A.2.6.10.2 String #1 Position

STRING #1 POSITION defines row and column of the first optional alphanumeric string.

Selections: CC, RR
Default: 01 01

A.2.6.11 String #2

String #2 defines if the second optional alphanumeric string has to be included into the print report.

Selections: YES, NO
Default: NO

A.2.6.11.1 Contents String #2

Contents String #2 defines the second optional alphanumeric string.

Selections: Any String
Default: XXXXXXXXXXXXXXX

A.2.6.11.2 String #2 Position

String #2 Position defines row and column of the second optional alphanumeric string.

Selections: CC, RR
Default: 01 02

A.2.6.12 String #3

String #3 defines if the third optional alphanumeric string has to be included into the print report.

Selections: YES, NO
Default: NO

A.2.6.12.1 Contents String #3

Contents String #3 defines the third optional alphanumeric string.

Selections: Any String
Default: XXXXXXXXXXXXXXX

A.2.6.12.2 String #3 Position

String #3 Position defines row and column of the third optional alphanumeric string.

Selections: CC, RR
Default: 01 03

A.2.6.13 Rate Position

Rate Position defines row and column of the rate.

Selections: CC RR
Default: 01 04

A.2.6.14 Master Total Position (Mtotal Pos)

Mtotal Pos defines row and column of the master total

Selections: CC RR
Default: 01 05

A.2.6.15 Reset Total Position (Rtotal POS)

Rtotal Pos defines row and column of the reset total.

Selections: CC RR
Default: 01 06

A.2.6.16 Date Position

Date Position defines row and column of the date.

Selections: CC RR
Default: 01 07

A.2.6.17 Time Position

Time Position defines row and column of the time.

Selections: CC RR
Default: 01 08

A.2.7. Test Menu

At the **TEST** menu, you can set passwords, perform service diagnostics, and integrator self tests.

A.2.7.1 Setting Up Passwords

The Mini 11-101F allows you to define protection levels and associate passwords with them to guard against unauthorized changes to operating parameters. At this menu, you designate a password. You have to activate the password at the Protection menu.

Access this scroll by pressing Run/Set-Up and scrolling until the display reads Test and press enter until the screen flashes.

Enter a desired password. Record this password and store in a safe place. To activate the password you must return to the Protection menu and follow these procedures.

1. Press **RUN/SET-UP**

   Protection displays

2. Press **ENTER**

   NOT ACTIVE should display

3. **PRESS ENTER** until the display flashes.

   You will be asked to enter the password you just selected in Section A.2.7.1 Setting Up Passwords.

4. Press the arrow keys to scroll through the numerical places and enter your designated password.
5. Press **ENTER** and select **ACTIVE**
6. Press **ENTER** to save the selection
7. Press **RUN/SET-UP** to return the integrator to Run mode.

A.2.7.2 Displaying Raw A/D Data (A/D Gross)

The **A/D GROSS** display shows the analog/digital converter gross, which is the total weight on the load cells. To access this display do the following:

Move to **A/D GROSS** and press **ENTER**.

A.2.7.3 Displaying Raw A/D Data (A/D Net)

A/D NET is the analog/digital converter gross after the zero constant has been subtracted. It indicates the weight on the load cell.

Move to **A/D NET** and press **ENTER**.

A.2.7.4 Displaying Pulse per Minute (Pls/Min)

The **PLS/MIN** displays the pulse per minute of the designated speed sensor. The values were set up in the I/O (Input/Output) menu at the Speed Input selection.

Move to the **PLS/MIN** and press **ENTER.**

A.2.7.5 Displaying Belt Speed (SP)

The **SP** menu item displays the current speed of the belt and is displayed in distance/time.

Move to **SP** and press **ENTER.**

A.2.7.6 Displaying Belt Loading (PS)

The **PS** menu item displays the wt/distance of the load on the load cell.

Move to **PS** and press **ENTER**.

A.2.7.7 Displaying Load Cell Output (LC SUP)

The LC SUP menu item displays the mV output of the load cell. The load cell output will change depending on the load.

Move to the **LC SUP** and press **ENTER**.

A.2.7.8 Displaying Correction Zero (C_Zero)

CORRECTION ZERO is used to trim the minimum value of the analog output. The value can be changed at this menu. Values manually entered are adjusted back to zero when a scale auto zero test is performed.

1. Move to **C_ZERO** and press **ENTER**, the current value displays.
2. Press the arrow keys to enter a changed value.
3. Press **ENTER** to save the changes.
4. Move to the next menu item.

A.2.7.9 Displaying Correction Span (C_Span)

The **C_SPAN** menu item sets the parameters or acceptable range for the analog output.

1. Move to **C_SPAN** and press **ENTER**, the current value displays.
2. Press the arrow keys to enter a changed value.
3. Press **ENTER** to save the changes.
4. Move to the next menu item.

A.2.7.10 Displaying the Software Version (Softwar Ver)

The current **SOFTWAR VER** in the Mini 11-101F is displayed for reference only on the Test scroll.

Move to **SOFTWAR VER** and press **ENTER**.

A.2.7.11 Testing Memory

MEMORY TEST is a self-diagnostics test that tests the Random Access Memory (RAM) of the Mini 11-101F Integrator.

Move to **MEMORY TEST** and press **ENTER**, **RAM OK** displays.

A.2.7.12 Testing Input

The **TESTING INPUT** diagnostic procedure tests the digital inputs and indicates if the inputs you entered in the **I/O MENU** are open or closed (on or off). (See A.2.4.7 Defining Input 2.)

1. Move to **INPUT TEST** and press **ENTER**. The display shows all three inputs at one time. (Example: INPUTS 010).

   The first digit on the right of the display refers to input 3; the second digit from the right refers to input 2 and so on.

   If an input displays 0, it indicates the input is open (off). If it displays a 1, it indicates the input is closed (on).
2. Move to the next menu item.

A.2.7.13 Testing Output

The **TESTING OUTPUT** diagnostic procedure tests the digital outputs and indicates if the outputs you entered in the **I/O MENU** are open or closed (on or off). (See A.2.4.10 Defining Output 1.)

1. Move to Output Test and press Enter. The display shows all five outputs at one time. (Example: OUTPUTS 10010).

   The first digit on the right of the display refers to input 5; the second digit from the right refers to input 4, and so on.

   If an input displays 0, it indicates the input is open (off). If it displays a 1, it indicates the input is closed (on).

2. Move to the next menu item.

A.2.7.14 Lamp Test

The **LAMP TEST** menu item tests the lamp in the LED display area.

Move to **LAMP TEST** and press **ENTER**. All LEDs and digits of the display should blink for a number of seconds.

A.2.7.15 Entering a Forced Value

The **FORCE VALUE** menu item allows you to enter a forced value of wt/time for testing or calibrating remote equipment.

1. Move to **FORCE VALUE** and press **ENTER**.
2. Press the arrow keys to enter the desired value, press **ENTER** to save your entry.

A.2.7.16 Setting the Time (Optional COMM Board)

The **TIME** procedure is done only if there is a COMM board installed. Begin this procedure at the **TEST** menu.

1. Scroll to Time 00:00:00, press **ENTER**.
2. Press the arrow keys to enter the correct time in hours, minutes, and seconds.
3. Press **ENTER** to save.
4. Move to the next menu item.

A.2.7.17 Setting the Date (Optional COMM Board)

The **DATE** procedure is done only if there is a COMM board installed. Begin this procedure at the **TEST** menu.

1. Scroll to date 00-00-00, press enter.
2. Press the arrow keys to enter the correct date in months, days, and years.
3. Press **ENTER** to save.
4. Press **RUN/SET-UP** to return the integrator to Run mode.

A.2.7.18 Permanent Scroll Record for Set-Up Scrolls

Following zero and span calibration, the Permanent Scroll Record should be completed. This record is useful for trouble shooting if the need arises. Test scroll entries should be recorded when the conveyor is running empty. A variable speed belt should be running at maximum speed during calibration and when recording data. If the scale system has static test weights, record the Test scroll readings with the weights applied in addition to empty

Appendix Table A-3: Scale Data Scroll

Scale Data Scroll	Data
Scale Units	
Decimal Place	
Scale Capacity	
Load Cell Capacity	
Number of Load Cells	
Filter	
Low Rate Set	
High Rate Set	
Rate Alarm Delay	
Auto Zero Tracking Range	
Auto Zero Track Limit	
Dead Band	

Appendix Table A-4: Calibration Data Scroll

Calibration Data Scroll	Data
Calibration Mode	
R-CAL Mode	
Load Cell MV/V	
Load Cell Resistance	
R-CAL Resistance	
Weigh Bridge Level Ratio	
Idler Spacing	
Number of Weigh Idlers	
Conveyor Angle	
Calcon R-CAL	

Appendix Table A-5: I/O Data Scroll

I/O Data Scroll	Data
Current Output Range mA	
Current Output Damping	
Divide Out	
Pulse Width	
Speed Input	
Language	
Input 2	
Input 3	
Input 4	
Output 1	
Output 2	
Output 3	
Output 4	
Output 5	
Alternate Rate & Total	
Data Format	

Appendix Table A-6: Alarms Scroll

Alarms Scroll	Data
Low Rate	
High Rate	
Remote Counter Overflow	
Belt Pulse Counter Overflow	
Cold Start	
Load cell Fail	
Maximum Zero Correction	
Math Error	

Appendix Table A-7: Optional Print Scroll

Optional Print Scroll	Data
Baud Rate	
Stop Bits	
Parity	
Word Length	
Handshake	
End of Line	
Delay End of Line	
Print Interval	
Report Format	
String #1	
Contents String #1	
String #1 Position	
Contents String #2	
String #2 Position	
String #3	
Contents String #3	
String #3 Position	
Master Total Position	
Reset Total Position	
Date Position	
Time Positions	

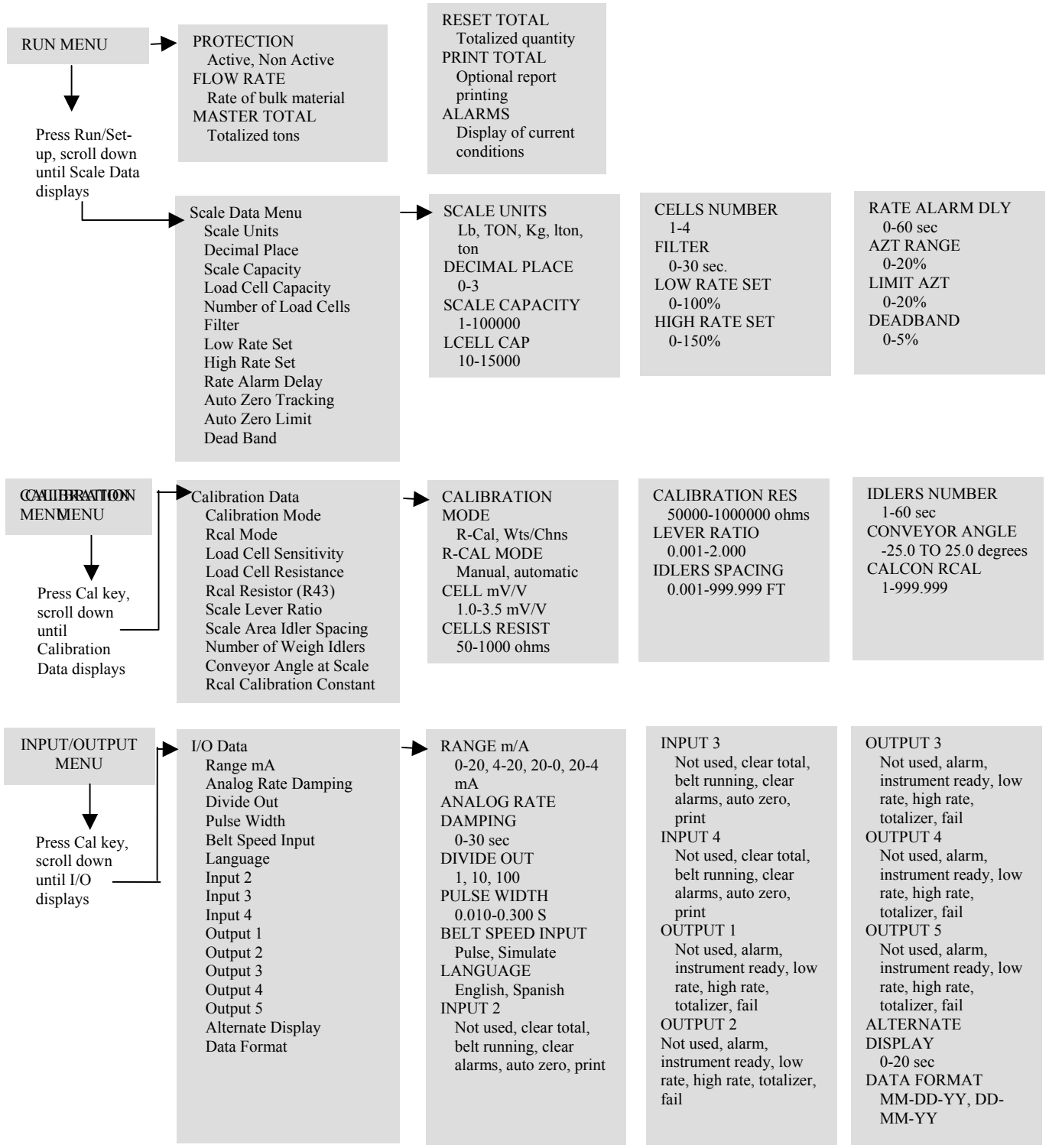
Appendix Table A-8: Test Scroll

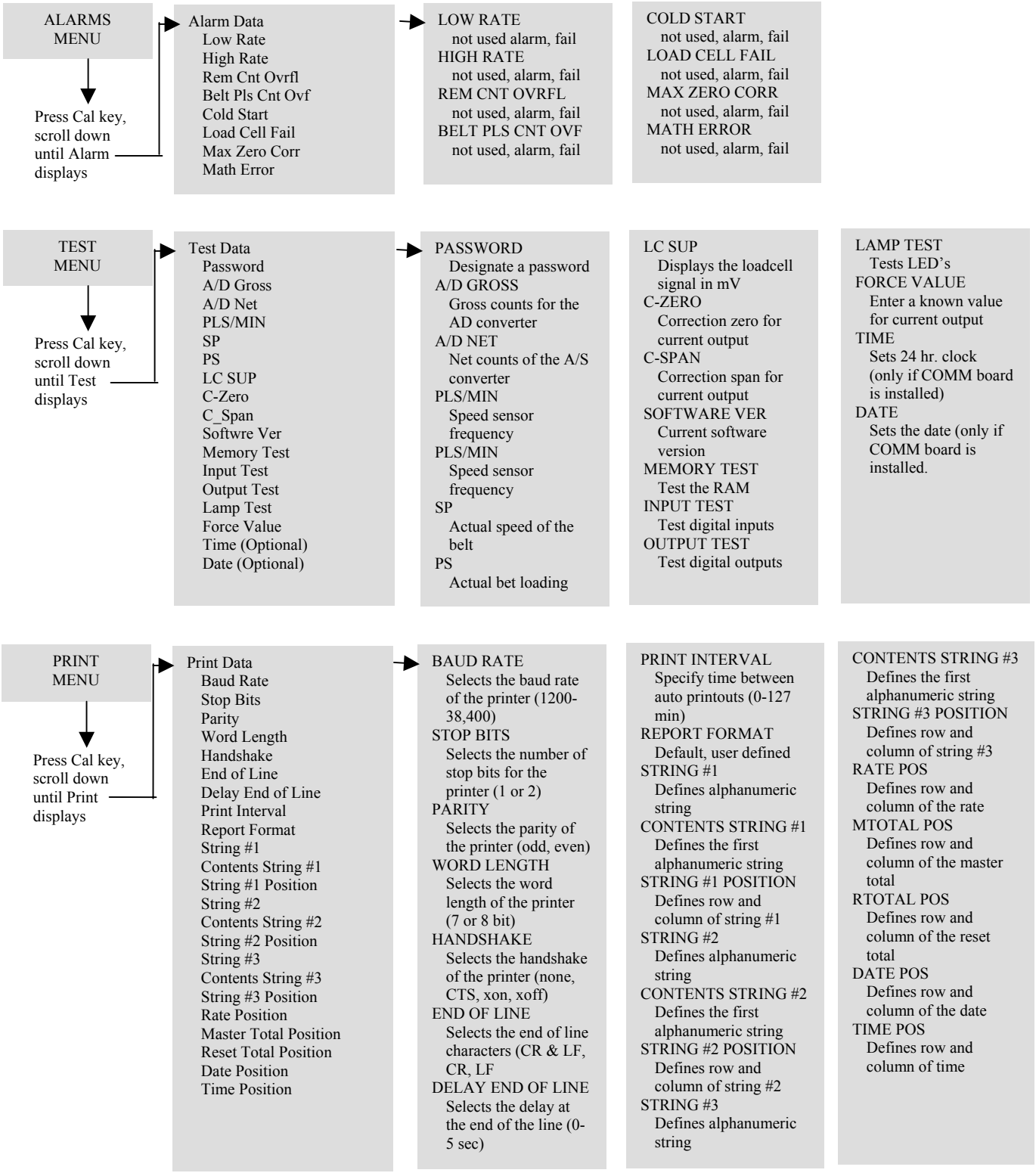
Test Scroll	Data
Password	
A/D Gross	
A/D Net	
Speed Pulses/Min	
Belt Speed	
Belt Loading	
Load Cell Signal mV	
Correction Zero	
Correction Span	
Software Version	

Appendix Table A-9: Calibration Scroll

Calibration Scroll	Data
Test Duration Length	
Test Duration Pulses	
Speed Pulses Pre-scale	
Manual Zero	
Manual Span	

Appendix B
Menu Tree




ALARMS MENU
Press Cal key, scroll down until Alarm displays
Alarm Data
Low Rate
High Rate
Rem Cnt Ovrfl
Belt Pls Cnt Ovf
Cold Start
Load Cell Fail
Max Zero Corr
Math Error
LOW RATE
not used alarm, fail
HIGH RATE
not used, alarm, fail
REM CNT OVRFL
not used, alarm, fail
BELT PLS CNT OVF
not used, alarm, fail
COLD START
not used, alarm, fail
LOAD CELL FAIL
not used, alarm, fail
MAX ZERO CORR
not used, alarm, fail
MATH ERROR
not used, alarm, fail
TEST MENU
Press Cal key, scroll down until Test displays
Test Data
Password
A/D Gross
A/D Net
PLS/MIN
SP
PS
LC SUP
C-Zero
C_Span
Softwre Ver
Memory Test
Input Test
Output Test
Lamp Test
Force Value
Time (Optional)
Date (Optional)
PASSWORD
Designate a password
A/D GROSS
Gross counts for the AD converter
A/D NET
Net counts of the A/S converter
PLS/MIN
Speed sensor frequency
PLS/MIN
Speed sensor frequency
SP
Actual speed of the belt
PS
Actual bet loading
LC SUP
Displays the loadcell signal in mV
C-ZERO
Correction zero for current output
C-SPAN
Correction span for current output
SOFTWARE VER
Current software version
MEMORY TEST
Test the RAM
INPUT TEST
Test digital inputs
OUTPUT TEST
Test digital outputs
LAMP TEST
Tests LED's
FORCE VALUE
Enter a known value for current output
TIME
Sets 24 hr. clock (only if COMM board is installed)
DATE
Sets the date (only if COMM board is installed.
PRINT MENU
Press Cal key, scroll down until Print displays
Print Data
Baud Rate
Stop Bits
Parity
Word Length
Handshake
End of Line
Delay End of Line
Print Interval
Report Format
String #1
Contents String #1
String #1 Position
String #2
Contents String #2
String #2 Position
String #3
Contents String #3
String #3 Position
Rate Position
Master Total Position
Reset Total Position
Date Position
Time Position
BAUD RATE
Selects the baud rate of the printer (1200-38,400)
STOP BITS
Selects the number of stop bits for the printer (1 or 2)
PARITY
Selects the parity of the printer (odd, even)
WORD LENGTH
Selects the word length of the printer (7 or 8 bit)
HANDSHAKE
Selects the handshake of the printer (none, CTS, xon, xoff)
END OF LINE
Selects the end of line characters (CR & LF, CR, LF
DELAY END OF LINE
Selects the delay at the end of the line (0-5 sec)
PRINT INTERVAL
Specify time between auto printouts (0-127 min)
REPORT FORMAT
Default, user defined
STRING #1
Defines alphanumeric string
CONTENTS STRING #1
Defines the first alphanumeric string
STRING #1 POSITION
Defines row and column of string #1
STRING #2
Defines alphanumeric string
CONTENTS STRING #2
Defines the first alphanumeric string
STRING #2 POSITION
Defines row and column of string #2
STRING #3
Defines alphanumeric string
CONTENTS STRING #3
Defines the first alphanumeric string
STRING #3 POSITION
Defines row and column of string #3
RATE POS
Defines row and column of the rate
MTOTAL POS
Defines row and column of the master total
RTOTAL POS
Defines row and column of the reset total
DATE POS
Defines row and column of the date
TIME POS
Defines row and column of time

Appendix C
Engineering Drawings

This appendix contains the engineering drawings and field wiring diagrams for the Mini 11-101F.

- Filed Wiring Diagram (D07286A-Y009)

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Appendix D
Reader Comment Section

As the user of this document, you are important to us. Your comments and suggestions are always welcome and encouraged. Please make a copy of the comment form, and then take a moment to fill out the requested information. Finally, send the form to us by mail or FAX using the information shown on the form. Your input can help Thermo improve its documentation. Thank you!

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Reader Comment Form

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REC 3968, Rev. K

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1. Does this manual meet your needs? Please explain.

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2. Did you find any incorrect or incomplete information? Please provide as much detail as possible.

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4. OPTIONAL: Please describe your job, position, responsibilities, and plant location. Include your name and address, if you wish.

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Your response is very important to us. THANK YOU!